THE IRON TRADE REVIEW

Vol. XXXI. CLEVELAND, O. DECEMBER 22, 1898. CHICAGO, ILL. Number 51

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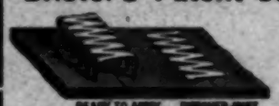

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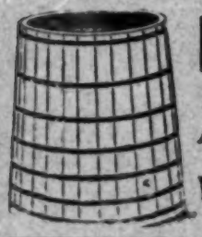

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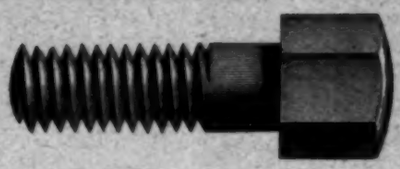

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. DECEMBER 22, 1898. CHICAGO, ILL. NUMBER 51

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade is finishing the year under conditions unparalleled for December. As in the preceding week, the largest activity has been in foundry irons, the buyers of which have reached simultaneously the conclusion that instead of the weakness they expected in December the year would end with a stronger market than at any time in the twelve-month. Already in this as well as in other lines there is a discussion of the possibility that demand may outrun supply in the first part of the new year. But there is a very clear recognition by producers of the dangers of a situation like the present and a very determined effort to keep the market free from excitement. Trouble will come, if at all, from the disposition generally shown by buyers, when indications of higher prices appear, to compete with each other for material for distant deliveries—material not needed to cover contracts in hand. From the amount of cautious talk abroad in the trade, it is evident that strong influences are being exerted on the side of conservatism. So far as raw materials are concerned the advances promise to be very moderate. Producers of Lake Superior non-Bessemer ores are conferring, and if they agree to form an association, the advance is not expected to be more than 20 or 25 cents. Some sales have been made even thus early at 20 cents advance over the prices of the past season. Foundry furnacemen, as they are now selling iron into which 1899 ores will enter, need to know what their ores will cost them, and are inquiring. In the past week foundry iron has had a good sale in Central and Western districts—not so large a total as the phenomenal record of the preceding week, but yet a remarkable December movement. Stocks of iron on furnace yards decreased 39,000 tons in November, and 36,000 tons additional went out of warrant yards. Furnace stocks were down to 544,000 tons on Dec. 1. Consumers of iron are themselves so well supplied with business for 1899 that they are not slow to believe that its record will materially exceed that of 1898. It is well recognized, moreover, that efficient foundry furnace capacity is practically all active. In Bessemer iron there will be considerable additions to production in the first half of 1899, from furnaces now building and, in the Pittsburg district, from changes now being made. In the second half of 1899 the effect of added Bessemer capacity will be more apparent. In view of these conditions valley furnacemen are not losing sight of the steel works project, mooted earlier in the year. The sales of Bessemer iron reported within the week amount to 25,000 tons at $10.25. In foundry iron, business is done at $8 Birmingham, for No. 2, where deliveries are such that the furnaces can accept the business. On valley foundry iron $9.75 is the usual figure. Steel billets are firm at $16, Pittsburg, and sales have been made at $16.25. The mills are well filled for the first quarter. The heet bar market is unsettled, pneding the development of the policy of the American Tin Plate Co. If it shall supply the bulk of its wants from a Western Pennsylvania and a Wheeling district mill, as is reported, the incentive to competition may be furnished early, to the steel works left out. Nothing definite has come, as yet, of the effort to get three large Western Pennsylvania plants into the American Steel & Wire Co., but there is a firmer feeling in wire products. Plates have advanced $1 to $2 a ton in the past week and some of the mills are unwilling to quote on remote deliveries. A strong feeling appears in structural material and there is more than a possibility that the anniversary of the present agreement, which was made Dec. 28, 1897, will bring an advance. Buyer appear to be acting on such a presumption. Sheets are stronger—in fact all finished lines are feeling the impetus of the movement in raw material, with the one exception of bars, which are persistently low, though the mills are very full of work. The fear that prices may advance enough to restrict exports, is wholesomely prevalent in all lines. Foreign rail business is offered on a large scale and steady shipments are being made on old contracts.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
705 PUBLICATION BUILDING, Dec. 21.

The unwonted strength of the market as reported last week continues without abatement. The heavy inquiry now extends to many of the finished lines, while in pig iron and steel prices are fully as firm as they were, with no indication of any slackening, even though the end of the year is close at hand. A buoyant feeling pervades the entire iron and steel market and even the conservative are talking of prices for next year which mean radical advances viewed from the standpoint of small margins and heavy tonnage, established by the developments of the past two years. The prophecies of still higher prices for pig iron and steel are based upon the heavy inquiry for all lines and the certainty that the consumption next year will be something unparalleled. Full weight seems not be to given in some quarters to the consideration that higher prices must have a very important effect upon the tonnage finding an outlet in foreign markets, and to the further consideration that the strength of the pig iron market, which was the foundation of the present advance, is not produced by conditions which are necessarily permanent or even long lived. A month or two ago the general conditions were scanned without special enthusiasm, and the general conditions are not much different, now, except that the tonnage of furnace metal which will be used direct in steel making is being still further increased.

PIG IRON.—There has been a moderate tonnage of Bessemer pig sold during the week under review, and the price is firmly established at $10.25, Valley furnace, and $10.75, Pittsburg. Furnaces making foundry and mill iron are taking an optimistic view of the situation in many cases, and some are naming prices which put them out of the market. Sales are being made, however, at a moderate advance over the prices of a couple of weeks ago. No. 2 foundry cannot be had below $10.10, Pittsburg, while for better grades of No. 2 fully $10.25 would have to be paid, and there are quotations above even this figure. Gray forge is strong at $9 to $9.25, valley, and $9.50 Pittsburg. It is believed that scheduled freight rates will be more strictly adhered to, and the full differential of 65 cents between the valleys and Pittsburg may obtain in both Bessemer and mill iron in the near future. We quote:

Bessemer, valley furnace	$10.25
Bessemer, Pittsburg	10.75
No. 1 Foundry	10.75 to $10.80
No. 2 Foundry	10.10 to 10.30
No. 3 Foundry	9.65 to 9.85
Gray Forge, valley furnace	9.00 to 9.25
Gray Forge, Pittsburg	9.50 to 9.65

BILLETS AND RODS.—Few active sellers are left in steel billets for the first quarter of next year, as the bulk of the mills are comfortably filled and are figuring only on the most desirable orders. The price is strong at $16, Pittsburg, for the first three months of next year, while specifications are coming in promptly and quick deliveries are being urged for the balance of December. As high as $16.50 has been quoted.

We note a sale of a moderate lot of billets at $16.25. Pittsburg, delivered, the freight being 15 cents. There is no market on sheet bars and no information as to recent sales can be had which would change the rate of $16 made some time ago when billets were a dollar lower than they are now. Speculation is being indulged in as to the course of the new American Tin Plate Co. in purchasing its steel. The tin plate production in 1899 will not be much over 6,000,000 boxes, unless the new concern takes the market now suppled by "drawback plates" (necessarily at a decided concession in price), or the demand increases materially, which is not so probable in view of the higher prices which will rule. To make 6,000,000 boxes will require 350,000 tons of bars, a quantity which could almost be supplied by the two bar mills, one completed and the other nearly so, which it is rumored have been arranged with by the combine in the purchase of the tin plate plants connected with them. Wire rods have advanced further and are now quoted at $21.50 to $22.

PLATES.—The market has been quite active, owing to a rush of specifications and a considerable tonnage of small orders, and prices have been advanced $1 to $2 by mills most heavily sold. We quote: Tank, 1.20c to 1.25c; shell, 1.30c; flange, 1.35c; fire-box, 2c and upward.

SHEETS.—There has been a heavy inquiry for sheets, and the official withdrawal of quotations and the appointment of a committee to draft a new schedule of prices (which committee has not completed its work yet) has not interfered with the booking of a considerable tonnage, at advanced rates, and the market is now firm at 1.90c to 1.95c for No. 28 common, for the first three months of next year. For deliveries running beyond April 1, the lower figure could not be done.

SPELTER.—The spelter market has eased off a trifle since last week, the decline in London being about 5s. and in St. Louis about 10 cents a hundred. We now quote St. Louis at 4.95c and Pittsburg 5.10c, at which price deliveries for January and February could probably be secured.

IRON AND STEEL SKELP.—This market is decidedly firm, but at unchanged quotations, as follows: Grooved iron skelp, 1.05c to 1.07½c; sheared iron skelp, 1.17½c to 1.20c; grooved steel skelp, 97½c to 1.05c; sheared steel skelp, 1.10c to 1.12½c.

FERRO-MANGANESE AND SPIEGEL.—There is no change to be noted in these lines, domestic ferro being quoted at $50 for 80 per cent, and spiegel weak at $23.50 to $24.

RAILS AND TRACK MATERIAL.—The rail situation has quieted down somewhat, the local mill taking orders now and then at $17 to $18. There continues to be a very good demand for track material, especially for links and pins, the quotations on which have been advanced ten cents a hundred owing to heavy orders placed. In other lines of track material rates are strong, but have not been advanced. We now quote: Spikes, 1.45c; track bolts, 1.65c to 1.70c; splice bars, 1.10c to 1.15c; links and pins are quoted from 1.20c to 1.27½c.

PIPES AND TUBES.—The mills are comfortably filled with business, there being the usual run of small orders. The volume of new business, while it is in small quantities, is claimed to be considerably above the average for December, and it is noted that specifications on old contracts are coming in to an extent which indicates the country is bare of stocks. We still quote additional discounts, six tens for less than carload lots, and six tens and five for car loads. Base discounts are: Butt weld, black, 55 per cent off; lap weld, black, 65 per cent off; butt weld, galvanized, 47½ per cent off; lap weld, galvanized, 52½ per cent off. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. Inserted joint casing is quoted at 60 off and screw and socket joint casing at 60 and 10 per cent off.

STRUCTURAL MATERIAL.—While no very large contracts have been placed, there have been a number of fair sized orders, and mills are still busy. There is considerable preliminary figuring on large business for next spring. We quote the list as follows: Beams and channels, 3 to 15 inches, 1.20c; 18 to 24 inches, 1.30c; tees, 1.25c; zees, 1.20c, and angles, 1.10c. Universal plates are generally quoted at 1.10c but some firms are holding for 1.15c and are getting business.

OLD MATERIAL.—There has been the usual run of small transactions, at unchanged prices, and we quote: Old steel rails, long lengths, $9.75; cut, $10 to $10.25; old iron rails, $13.75 to $14; wrought iron scrap, $11.50, net valley; cast borings, $6; busheling scrap, $9, net; car wheels, $10.25, gross; cast scrap, $9, gross; iron axles, $6, net; steel axles, $12.50, gross; charcoal scrap, $10, gross; wrought turnings, $6.75, net, valley.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, Dec. 21.

Although the total of orders last week was not as large as in the week previous, the market was active and a very good business was done in nearly every line. Mills and furnaces are well sold ahead, and many of them are entirely out of the market on some lines of material. The mills of the Illinois Steel Co., are so full in every line but bars, that they can accept very little business for delivery within the next three or four months. Consumers are taking material as fast as they can get it shipped, and in many cases have increased the size of their orders.

PIG IRON.—Sales of both Northern and Southern iron were large last week, though not up to the record of the week previous. The largest sale closed was in excess of 5,000 tons, and orders ranged from this down to car load lots. A great many buyers were in the market, indicating a general belief that prices are as low now as they will be for some time. Statistics seem to bear this out, and in fact induce the belief that there may be a shortage in foundry irons before the middle of next year. Whether higher prices will be made in the near future is not yet determinable. Everything goes to indicate that furnaces would have no difficulty in obtaining more money, but there seems a disposition on their part to maintain the present level as long as possible, on the principle that with present prices the consumers will use more iron, and keep the consumption up to the present basis, while if quotations are advanced there is always a liability of a decided decrease in the use of iron. And on the present basis it is conceded that modern furnaces can make a fair profit. The foundries in this district, with very few exceptions, are taking all the iron they can melt. The consumption in this territory is at the maximum. A few architectural and jobbing foundries may not be running full, but they are very few; with many others the situation is expressed by a foundryman who said: "Our production is largely in excess of our capacity." Quotations are unchanged as follows:

Lake Sup. Charcoal	$11 50 @13 00	Southern Coke No. 3	$10 60 @ 10 85
Local Coke Fdy. No. 1	11 50 @ 12 00	Southern No. 1 Soft	11 10 @ 11 35
Local Coke Fdy. No. 2	11 00 @ 11 50	Southern No. 2 Soft	10 85 @ 11 10
Local Coke Fdy. No. 3	10 75 @ 11 00	Southern Silveries	11 75 @ 12 25
Local Scotch Fdy. No. 1	11 50 @ 12 00	Jackson Co. Silveries	12 50 @ 14 50
Local Scotch Fdy. No. 2	11 00 @ 11 50	Ohio Strong Softeners	12 00 @ 12 50
Local Scotch Fdy. No. 3	10 75 @ 11 00	Alabama Car Wheel	15 00 @ 16 00
Southern Coke No. 1	11 10 @ 11 35	Malleable Bessemer	11 00 @ 12 00
Southern Coke No. 2	10 85 @ 11 10	Coke Bessemer	11 00 @ 12 00

BARS.—This is the weakest branch of the market. Notwithstanding the fact that most mills have well filled order books, and the demand is as large as it has been for a long time, and further that material costs more than it did in November, prices remain low and weak. Sales last week were very good, and included one order of 2,500 tons of steel bars. All classes of consumers are represented, the railroads and car works buying the largest tonnage. Common iron is selling from 1c to 1.10c; guaranteed iron, 1.05c to 1.15c; billet stock steel, 1.05c to 1.15c.

RAILS AND TRACK SUPPLIES.—Sales of about 15,000 tons of rails were made last week by the local mills, and further sales were made in this market by mills east of here. A number of good orders are still to be placed. Light rails are in good demand. Quotations are made as follows: Standard section rails, $18 to $19; light rails, $20 and upwards; steel splice bars, 1.15c to 1.25c; track bolts with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.55c to 1.60c.

BILLETS AND RODS.—The local mills are sold up so that they are unable to accept further business for anything like early delivery. A few sales were made in this market last week by Eastern mills. Billets are quoted at $17.50, and rods at $22.50.

CAR ORDERS.—No especially large orders were placed here last week, but a number of small contracts were given out, and there are more to follow. The demand for car material is large, and steady sales are made of every kind of material. The local car works are booked ahead for four to five months, and one has orders which will keep it busy for the next eight months.

STRUCTURAL MATERIAL.—The Cable building is being figured, and will be let within a short time. This will take about 1,000 tons of material. Figures are being taken on a large country residence for Otto Young, the manager of the Fair, which will take over 400 tons of iron and steel. No other noteworthy contracts came up last week, but there are a number in abeyance, and general business in orders from 1,000 tons down was most excellent. Quotations on plates are higher. Quotations are as follows: Beams, 15 inch and under, 1.35c to 1.40c; 18-inch and over, 1.45c to 1.50c; angles, 1.25c to 1.30c; plates, 1.25c to 1.40c; tees, 1.40c to 1.45c; zees, 1.35c to 1.40c. Small lots from stock are quoted at ¼c to ½c higher.

PLATES.—There continues to be a heavy demand, which the mills are unable to satisfy. The local mills refused an order of 4,000 tons last week, after having booked orders for about 3,000 tons, which filled their order books for the next two months, or more. Outside mills are fully as well sold up, and it is exceedingly hard to place orders for delivery in anything like a short time. The market is very firm, and prices on plates are higher. Some Eastern mills quote higher prices than we give. We revise quotations as follows: Tank plates, 1.30c to 1.40c; flange steel, 1.35c to 1.45c; fire-box steel, 1.85c to 5c.

SHEETS.—Business was good in both black and galvanized sheets. The demand continues, and orders will be large for some time. Quotations are made at 1.95c to 2.05c for black sheets, and 80 and 7½ per cent off for galvanized.

MERCHANT STEEL.—Considerable sales were made last week, and the demand gives every indication of a good trade for some time to come. The local dealers report having had a very satisfactory trade for the season of the year. Quotations follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.70c; smooth finished tire, 1.50c to 1.60c; tool-steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—Business appears to be improving. Good sales of old rails were made last week, including one order of 1,000 tons. The demand for melting scrap is increasing all the time. Dealers' selling quotations are as follows:

Old iron rails, gross,	$13 00@$13 50	Axles, net	$14 50@$15 00
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 25@ 4 50
Old steel rails, short	8 75@ 9 00	Wrought turnings, net	6 00@ 6 50
Old wheels, gross	11 50@ 11 75	Axle turnings, net	7 00@ 7 25
Railroad forge, net	11 50@ 12 00	Mixed steel, gross	7 45@ 7 50
Dealer's forge, net	10 00@ 10 50	Stove plates, net	5 75@ 6 00
No. 1 mill, net	8 50@ 8 75	Heavy melting steel, gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron aplice b., net.	12 75@13 00
Malleable cast, net	8 00@ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., Dec. 21.

The producers of non-Bessemer Lake Superior ores had a preliminary conference last week and are in session to-day. The attempt is being made to agree on a schedule of prices, and effect an organization similar to that of the old-range Bessemer ore companies. Furnacemen have been making inquiries for 1899 ores and it is understood there has been some selling at an advance of about 20 cents above this season's basis. There is not much difference between the figures of the more optimistic and the more conservative of the non-Bessemer producers. For an ore carrying 62 per cent iron and 12 per cent moisture the latter would establish a price of $1.95, as against $1.80 the past season. The former put their figure at $2.10. It is predicted that the final figure, if agreement comes, will be very close to $2. Wage advances, amounting to 15 to 20 per cent between the two seasons, and the certainty of higher lake freights, with the removal of a considerable tonnage from the lake to the Atlantic coast trade, account for about 15 cents advance, it is estimated; so that on the basis talked of, the royalty-paying mines idle the past season will have little inducement to start unless a new understanding can be had with the fee owners. With the status of non-Bessemer ores determined, the problems remaining will relate to old-range Bessemers and Mesabi ores. It is probable that the entire ore situation for the new year will develop much earlier than has been known in the history of the trade.

PIG IRON.—Sales of 25,000 tons of Bessemer iron at $10.25 valley furnace, made in the early part of last week, are to be added to the large total previously taken at $10. For the present there is no furnace quotation, the policy being to let conditions determine the price an each transaction as it comes up. There is not so large an amount of Bessemer iron to be had for delivery in the first half of 1899 as has been supposed; and while the heavy conversion now going on seems in the minds of some sellers to warrant a material advance, there is evidence that a very conservative influence is at work. The market for foundry iron has been active, and a number of contracts have been closed for the first half of 1899. An advance of $9.75 valley furnace for No. 2 is general, yet in the past week a considerable sale was made at $10.25 delivered in Northern Ohio, freight being 75 cents. On the other hand the quotation of $10 at furnace has been made. Some sales of Southern iron are included in the week's business, these being at the advanced price of $8 Birmingham for No. 2. Gray forge has sold at $9.25, valley furnace, in the week and with Southern at $9.90 valley mill, some valley makers are holding for $9.50. Lake Superior charcoal iron, quiet for some weeks, is a trifle more active. We quote f. o. b. Cleveland:

Bessemer	10 75	Valley Scotch No. 1	$10 65@10 90
No. 1 Strong Foundry	10 65@10 75	Valley Scotch No. 2	10 25@10 40
No. 2 Strong Foundry	10 25@10 40	Gray Forge	9 90
No. 3 Foundry	10 00	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—An advance of $2 a ton on tank plates has been made in the week, bringing them to 1.25c Cleveland and Pittsburg mill. Even on this basis the mills are chary of selling ahead, and at the same time are so crowded that they can do little on filling-in orders. The situation is very firm. There has been a rumor of a probable advance in structural steel, but nothing has been done by the mills, though some consumers are disposed to cover for the early part of the new year. Bars have not shared as yet in the firmer tendency in other lines, $15.75 to $16 Cleveland for billets and $9.35 to $9.50 valley mill for gray forge being still accompanied by quotations of 1c at mill for steel bars and 95c for iron. The sheet market is a trifle firmer. In wire and nails the approach of the new year has given more firmness, $1.15 Cleveland, being quoted for wire and $1.30 for nails in single car load lots.

OLD MATERIAL.—The better prices for foundry and forge irons have not been felt here, as yet. The stationary price for bar iron keeps busheling scrap down. The quotation is about $8.50 at mill. Cast scrap is quoted $8.50; No. 1 wrought, $11.50, valley. Old iron rails are $14; old steel rails, $10 to $10.50.

CINCINNATI.

Dec. 20.

Naturally after the flurry last week there has not been the same heavy buying of Southern iron this week. Trade, however, has been good. In this market there has been a steady call for malleable brands and there has been a sudden awakening of interest in Southern car wheel charcoal metals. The trade in charcoal iron has been for some time very slow, but the tonnage this month will probably be larger than the total of the last three or four months. Sellers report that it has not been as difficult to convince buyers that prices have really advanced as was anticipated, and that events are shaping themselves up so that the new year is entered upon with the iron market in better condition than in many years. The statistical situation is that consumption continues largely in advance of production, notwithstanding production increased during November approximately 7,650 tons. The stocks at the furnaces and warrant yards went off during the month of November 76,000 tons, leaving of all qualities and grades about three weeks' supply, if it were all convertible. We quote for cash f. o. b. cars Cincinnati: Southern Coke, No. 1 foundry, $10.25 to $10.50; No. 2, $10 to 10.25; No. 3, $9.50 to $9.75; No. 4 and gray forge, $9 to $9.25; mottled, $9 to $9.25; No. 1 soft, $10.25 to $10.50; No. 2, soft, $10.00 to $10.25; Hanging Rock charcoal, No. 1, $14.75 to $16; Jackson Co. silvery; No. 1, $1.250 to $12.75 standard Georgia car wheel, $14.25 to $15.

CONSUL MONAGHAN has reported to the State Department at Washington that a formidable movement has been successfully started by German manufacturers to combine against American iron and steel producers. A dispatch says that the Germans have become alarmed at the American manufacturers, ability to compete with them in their own German markets.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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G. H GARDNER, President. A. I. FINDLEY, Editor.

CHICAGO:
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B. M. GARDNER, Associate Editor and Western Manager.

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THE RIGHT BASIS FOR PRICES.

The iron trade of the United States is now facing a situation that calls for all the wisdom of its best heads, that there may be the best outcome. We have referred week by week to the various stages of its development, as they have appeared in market transactions and in broader trade movements. It is not necessary to repeat what is so familiar to all who have studied the drift of the past six months and who are informed, also, as to the abundant promise thus early given for the iron and steel trade of 1899. The question uppermost now is, how shall prices be kept on a basis that while insuring full operation and fair profits for the producer shall result in the maximum consumption, preserve a healthy condition at home, both in the early and the remoter future, and cause no diminution in our export trade, that has expanded in so gratifying a way in the past year. It is by no means a simple problem, and its solution is complicated by the fact that in some departments of the trade control of prices is exercised by producers.

Fortunately the great rail business is to go on with little restriction from agreement. The prices that have been fixed on Central and farther Western business are quite in line with those prevailing in the unhampered market for Bessemer steel billets; and Eastern roads have no complaint to make of any lack of competition for the business they have placed. The iron trade is to be congratulated that it has been saved from the carrying out of counsels that, could they have prevailed, would have put steel rails $2 a ton higher than they are to-day, and beyond all peradventure have diminished materially, by that increment of price, the tonnage of business placed by the railroads for the coming year Surely the steel manufacturer needs to ask, above every other business endowment, for wisdom to know where to put his price. The history of the ore association of 1896, of the bolt and nut pool, of the wire nail pool, the old beam pool, and of associations and pools by the score, that might be named, is certainly sufficiently instructive as to the follies growing out of prices that curtail production and set producer and consumer at variance. We have no means of knowing what the Lake Superior ore trade of 1896 would have been, but for the blunder that put the prices for Bessemer ores at the high level maintained in that year. Unquestionably the day of the producer-consumer as a dominant factor in the iron ore trade was hastened by the work of that year. No one can say what an impetus might have been given to the iron trade in the same year, had the victory for sound money been followed at once by a price on rails that would have encouraged the railroads to buy and thus have set wheels in motion in innumerable lines. But the fact is well understood that in both these cases the collective judgment of wise heads did an injury to the represented trades that will always be a monument of association folly. The law is of universal application. Its working in respect to articles of general consumption has been well illustrated by Mr. David A. Wells in "Recent Economic Changes," from which we quote:

> The decline in the average price of fair refining sugar in this country (in bond) was from 4.75c per lb. in 1882 to 2.92c in 1886, while the average consumption per capita, which was 39 pounds for the five years from 1877 to 1882, was 49.8 pounds for the five years from 1882 to 1887, and 52.6 pounds in 1888. Comparing 1888 with 1887, the domestic consumption of sugar increased over 11 per cent or largely in excess of any concurrent growth of population. Converting, now, so much of this larger consumption as was due to diminished price (probably more than 100,000,000 lbs.) into terms of acres and labor employed in its production; into the ships and men required for its transportation; into the products, agricultural and manufactured, and the labor they represent, that were given in exchange for it, and we can form some idea of the greater opportunities for labor through larger volumes of exchanges and the increased comfort for those who labor, that follow every reduction in the cost necessary to procure desirable things.
>
> In 1887, with an import price of about 16c per pound our importation of coffee amounted to 331,000,000 lbs. In 1885, with an average import price of 8c the importation was 572,000,000 lbs. Between 1873 and 1885 the coffee product of the world that went to market, concurrently with this large decline in its price, increased to the extent of 52 per cent. Subsequent to 1885 the price of coffee, by reason primarily of a deficient crop in Brazil, greatly advanced, and consumption declined in the year 1887 to the estimated extent of a million bags for Europe and an average of two pounds per head in this country. With the decline in volume of exchanges consequent on such a decline in the production and consumption of this commodity, the opportunities for the employment and remuneration of labor must obviously also have been comparatively reduced.

While we do not agree with the writer in some of the deductions he makes from these phenomena of consumption, there is no escaping the general law of enlarged consumption under lower prices, where purchasing power is substantially the same. There is no question that with the poise that exists in the iron trade to-day, production being so well balanced by consumption—somewhat more than balanced, as is well known—and with consumers so long habituated to a low level of prices, it would take no great advance to effect a curtailment of consumption. The export trade, for example, is in such a state that only a small advance would be required to shake the faith of foreign buyers in the assurances

given them that American iron and steel manufacturers intend to hold their trade permanently. The fear that once having become accustomed to American steel, the price would be put up on them, has made foreign buyers slow to take up with our products. It will not do for American manufacturers to give them any reason to say that these fears were well founded.

So far as the iron ore interest is concerned, it would seem that it is giving every aid to that conservative spirit in the trade that would save it from anything having the semblance of a boom. Both Bessemer and non-Bessemer producers lean to the view that 20 to 25 cents advance, or practically so much as will fully cover the increased labor cost and the advance of 5 to 10 cents in contract lake freights, sure to come next season, is sufficient. It will be well if the same conservatism rules in the counsels of the producers of Bessemer iron in the two valleys. Before 1899 is out, there is little quuestion that the effective productive capacity in Bessemer furnaces will be again in excess of the converting capacity of the Central West, and natural law will interfere to establish prices. Meantime it will be wisdom if those who temporarily have the making of prices in their hands, look ahead, not one month or two months, but to the probable developments of the coming year.

The tin plate trade is now practically under control of a single producer. It will take wise counsel to work out a straight line, as against the influence that is bound to be exerted by stock market interests. Structural steel manufacturers have exercised an extreme of caution in fixing prices the past year, and it may be expected that the same spirit will dominate this branch of the trade in 1899. A beam pool of the old type is an impossibility.

If throughout the trade there is the same willingness to make haste slowly and to look to the far future, that is evident in the ore trade, there need be little anxiety over the possibilities of a boom and its train of disaster and demoralization.

THE iron and steel import statement for the first 10 months of the year shows a total somewhat less than the record for the same period in 1897. Swedish and other special bars have furnished a larger tonnage; but tin plates have kept on declining:

IRON AND STEEL IMPORTS TO THE UNITED STATES.—GROSS TONS.

	October.		Jan.—Oct.	
	1897	1898	1897	1898
Pig iron	2,806	2,358	14,139	21,787
Scrap iron and steel	222	466	1,130	1,450
Bar iron	1,235	1,480	10,742	15,910
Iron and steel rails	81	.....	230	190
Hoop and band iron	.....	.....	27	3
Ingots, blooms, etc	679	806	13,766	8,953
Sheets and plates	410	95	2,258	1,873
Cotton ties	.....	.....	105	.....
Tin plates	4,103	3,363	72,223	60,046
Wire rods	1,977	1,108	12,759	13,451
	11,514	9,596	127,379	123,667

The imports of iron ore were 9,940 tons in October, as against 25,503 in October, 1897. For the first 10 months of the year the imports of iron ore were 151,054 tons, as compared with 407,425 tons to the end of October last year.

THE Engineers' Society of Western Pennsylvania gave a smoker and informal luncheon at their rooms at 409 Penn ave., Pittsburg, Saturday last. Capt. A. E. Hunt, of Battery B, and president of the Pittsburg Reduction Co., was to have spoken on "Engineers' Work in the War," but was called away at the last moment, and John A. Brashear, a past president and manufacturer of telescopes and lenses, gave a talk on "Range Finders," the lenses for a great many of which he has been manufacturing in his plant in Allegheny City.

CARNEGIE CO. TO BUILD STEEL CARS.

(By Telegraph.)

PITTSBURG, Dec. 21.—It can now be announced as a certainty that the Carnegie Steel Co., Ltd., will build a plant for the manufacture of steel cars, and that it will be located on what is known as the Hays estate property, west of Homestead. Its capacity will be about 40 cars a day. The plans for the enterprise include also a large axle forge. Work will begin at once.

The Hays property, for which negotiations have been thus concluded, is on the south bank of the Monongahela River, and extends from Homestead to the Baltimore & Ohio's Wheeling division railroad bridge. The tract is about one and one-half miles long, and from one-eighth to one-fourth mile in width. It is along the lines of the Pittsburg, McKeesport & Youghiogheny and Pittsburg, Virginia & Charleston Railroads, and through the territory the Union Railroad has already secured the right of way. This purchase makes the Carnegie Steel Co. the sole possessor of the vast acreage extending along the Monongahela River from the railroad bridge, opposite Glenwood, to and including the river frontage at Duquesne. Large purchases of land have been made by the Carnegie Steel Co. in the year, giving it possession of the territory fronting on the river between Munhall and Duquesne, a distance of over five miles. With the new tract the company will own over seven consecutive miles of land on the Monongahela River.

The Philadelphia Iron Market.

Dec. 19.

With stocks at furnaces amounting to little more than a two weeks' supply, and these decreasing while production increases—consumption amounting to well over 1,000,000 tons a month—there is an unprecedentedly strong situation for December. It is evident, also, from the rate at which iron is being ordered forward by foundries, that there will be a reduction in stocks in December, something not known in years. The holiday suspensions for repairs will enable the furnaces to catch up a bit, but the gain upon the mills and foundries will hardly be appreciable. There is even discussion on the possibility of an iron shortage in the first half of 1899; but prices as yet give no indication that such a contingency is seriously considered. A hardening is evident and orders for large lots with extended delivery can hardly be placed at the current rates for ordinary orders. We quote No. 1X foundry at $12 to $12.50, Philadelphia; No. 2X, $11 to $11.50; No. 2 plain, $10.60 to $10.75; standard mill iron, $10.25 to $10.50; ordinary, $10 to $10.15; basic, $10.25. In billets, some business has been done at $17.75, but in view of the condition of the Pittsburg market sellers are not pushing sales and some are quoting $18. Some business is pending in Eastern steel, in which $17.60 is being considered. Prices in all lines of gnished products are firm, but bars show no change. Plate mills have advanced quotations $1 to $2 a ton, and some are unwilling to quote on any but moderately early deliveries, seeing the possibility of yet further advances. Structural material also is very firm with some figuring already going on for spring work. We quote tank plate at 1.35c; angles, 1.25c to 1.35c; beams and channels, 1.40c to 1.50c; high grade bars at 1.25c to 1.30c; refined iron, 1.10c to 1.15c.

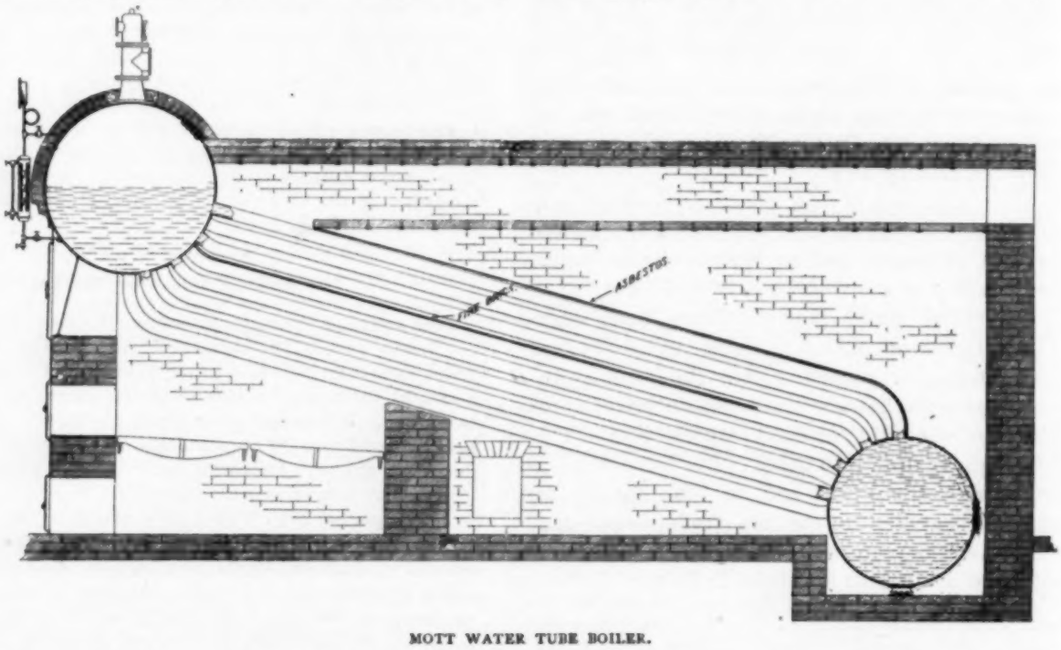
THE preferred stock of the American Tin Plate Co. whose organization and charter provisions are given in detail elsewhere, closed at 93¼ last Thursday, the day the officers were elected. The common closed at 35¼. Thus 200 shares—100 of each—for which $10,000 was paid, each share of preferred carrying one of common, were worth in the market on the day of organization $12,900. The preferred stock sold on Saturday, Dec. 17, at 98 and the common at 38¼—that which cost $10,000 being thus worth $13,625.

MOTT WATER TUBE BOILER.

A water tube safety boiler, recently patented by J. J. Blackmore, and to be placed on the market by the J. L. Mott Iron Works, 84 Beekman st., New York, is shown in the illustration. It is made entirely of steel, and safe working is possible at any pressure up to 250 pounds. The drums are made of flange steel, one-half to five-eighths inch thick. The tubes are all expanded into the shells without any intermediary cast iron parts. The rear drum is left free to provide for expansion and contraction due to changes of temperature. The arrangement of the heating surface enables the radiated heat of the fire to reach two-thirds of all the tubes in the boiler, and the fire travel is long enough to extract the heat from the gases before they escape to the chimney.

The drums are so located that the action of the fire does not wear them. The rear drum, in which all deposits are gathered, is entirely away from the action of the fire, hence caking of any substance on the shell is avoided. The tubes are all free to expand and contract as the temperature of the boiler changes, and each tube is entirely free from all others. The three lower rows of tubes can be easily cleaned from the rear drum; they can also be easily removed in case a repair should become necessary.

There are only two packed joints in the boiler, and only two joints that need to be removed to examine or clean the inside parts of the boiler and these are the manhole covers in the drums.



MOTT WATER TUBE BOILER.

The sectional illustration shows the provision for complete internal circulation of the water in the tubes. The lower set of tubes being in direct contact with the fire is the more intensely heated, and in these tubes an upward current is started from the lower drum, while the upper set being in contact with the heated gases only, and much cooler, permits a return circulation from the upper drum. The feed water may be introduced into the upper drum or into the lower one, depending largely on the quality of the feed water used. The lower drum being large and away from the action of the heat, the mud is collected at the bottom and may be blown out in the usual manner. For buildings where floor space and height of ceilings are restricted, this boiler has special advantages. It can be placed in any position where a tubular boiler of equal power could be set. The height, width or length can be varied to suit the requirements of the building. The boiler is shipped in sections and thus the largest size can be taken through a door 44 inches wide.

An advantage that ordinarily is not found with a bent tube boiler is that the Mott type can be cleaned inside as well as outside with a straight rod cleaner. The bend at the rear end of the lower tubes is so slight that it does not prevent a straight tube cleaner from being used. This applies also to the upper tubes on the upper drums.

QUESTIONS CONCERNING NUTS AND BOLTS.

The "M. C. B. Committee on Bolt Heads and Nuts," of which B. Haskell, Grand Rapids, Mich., is chairman, has sent out the following circular, which will be interesting to bolt and nut manufacturers:

Do you make the square-headed bolts used on your line?

If you make them, what standard do you follow as regards size and thickness of head?

If you make them according to M. C. B. or Sellers' standard, do you find any difficulty in procuring a perfect head at one operation of the boltheader?

When purchasing square-headed bolts, do you specify any standard for head?

Have you ever found any objections on the part of manufacturers to furnishing bolts with Sellers' standard head? If so, please state their objections.

Do you find from any evidence from service that the heads are not large or thick enough?

Please give thickness and size of square heads from one-quarter inch to two inches in diameter.

What standard do you follow in the manufacture of square nuts?

Do you specify any standard? If so, what one, when purchasing square nuts?

Do you make or purchase square nuts used on your line?

Do you find any difficulty in obtaining square nuts according to Sellers' standard?

Please give the thickness and size of square nuts from one-quarter inch to two inches which you make or use.

Review of Domestic and Foreign Iron Trade in 1897.

General Manager James M. Swank has prepared for the 19th annual report of the U. S. Geological Survey, Mineral Resources Division, a review of "The American and Foreign Iron Trade in 1897 and Immediately Preceding Years." Advance publication is made in pamphlet form. The home statistics are based upon the annual report of the American Iron and Steel Association, and to these are added a discussion of the world's production of pig iron and steel in 1897 and a resume of authoritative statistics of production in iron and steel, coal and coke in Great Britain, Germany, France, Algeria, Belgium, Austria-Hungary, Sweden, Spain, Italy, Russia and the Dominion of Canada. Added value attaches to such a treatise at a time in which the United States is being reckoned as a large factor in international trade.

THE report is denied that the Carnegie Steel Co. will erect a new plant on the site of the old Duquesne Tube Works, which the company purchased recently, and it is further denied that the Schoen Pressed Steel Co. will erect its new plant on that ground.

IMPROVED PNEUMATIC HAMMER.

Henry Breitenstein, of Laramie, Wyoming, has developed the hammer shown in the two cuts below, for use with compressed air. A departure has been made from the construction of other compressed air hammers, in which the movement of the hammer or piston is stopped through the removal of the tool from the tool-holder, by placing additional ducts and ports in the wall of the cylinder and valve-chamber, that are otherwise unnecessary for the operation of the hammer. The common use of throttle valves to regulate the force of the blow of the hammer against the tool, is also dispensed with. The inventor has sought to make the hammer automatic simply by the parts necessary to operate it.

In using this hammer, one hand is on the handle C; the other inserts the tool J in the tool-holder I and places it against the work to be operated upon. A slight pressure on the handle will move the hammer E backward, allowing the fluid-pressure to be admitted through the full opening of the port f', through the duct g h and port f, moving the hammer backward to its farthest travel, when the air pressure over the valve F' in the valve chamber B will exhaust through the duct c, port d, groove e in the hammer E, port d', duct c', and valve exhaust port d''. The valve F F' will now be moved upward against the valve chamber cap H, closing the inlet port f, and exhaust opening through groove k, holes 'k'' in hollow valve F F' and opening the exhaust port i in valve-bush G, allowing the pressure in front of the cylinder D to escape through port f', ducts g h, port i, and opening k' in valve-bush G.

Fig. 1.

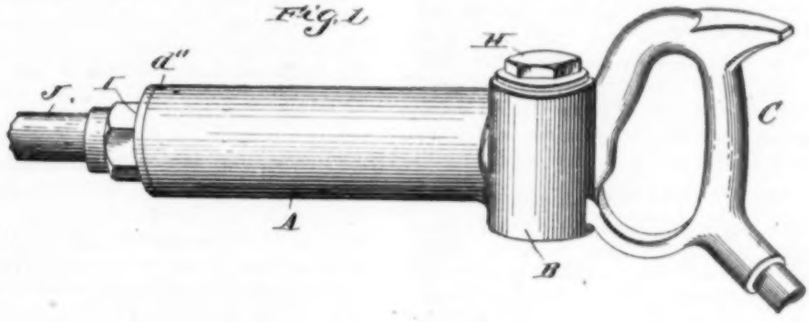
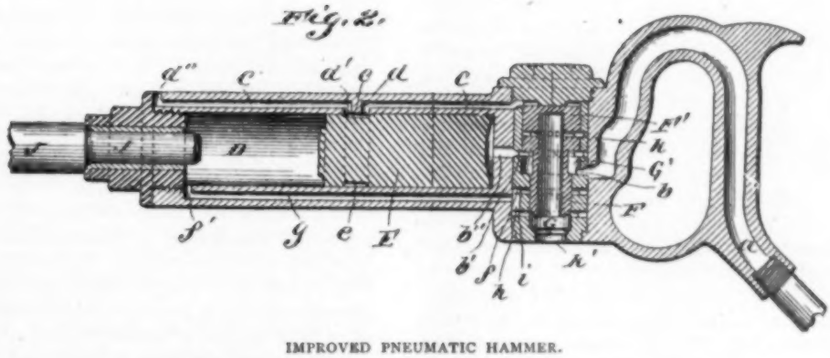


Fig. 2.



IMPROVED PNEUMATIC HAMMER.

The tool J extends through the tool-holder I one-quarter inch. The travel of the hammer is regulated by the ports d d'. If the operator desires to strike a light blow or vary the blow of the hammer against the tool, he can do so by grasping the tool and tool-holder with the hand that holds the tool, allowing the hammer to move the tool part way out of the tool-holder, varying the pressur on the handle with the other hand, and holding it in this position, regulating the force of the blow from a very light blow to the full force of the hammer by holding the tool with pressure on the handle sufficient to let it extend one-quarter inch through the tool-holder.

To stop the hammer the tool J is withdrawn. The hammer then moves forward against the opening in the tool holder. The valve F F' moves downward far enough just to cover the inlet-port b' b'' and not far enough to open communication to the opening k' in the valve-bush G. Should the valve F F' be moved farther downward, pressure from over the top of the valve F' will escape into the cylinder D, and out of the cylinder through the hollow valve F F', when it will be quickly moved upward again far enough to establish an equilibrium over the inlet port b, and remain at rest in this position until the tool is inserted in the tool-holder placed against the work.

FREIGHT rates from Duluth to New York by all-rail routes are said to have been quoted recently as low as 10 cents per 100 pounds, or $2 per ton. Calling the distance 1,500 miles, this is equivalent to only 1⅓ mills per ton-mile. The New York *Journal of Commerce* also says: It is reported that early last week one of the lines made a contract with a large exporting firm to carry wheat from Chicago to New York for eight cents per 100 pounds. From this rate is to be deducted three cents per 100 pounds for lighterage in New York, making a net rate for the railroad of only five cents. A rate of nine cents per 100 pounds on wheat from Chicago to Baltimore was made recently by another line, but no lighterage charge was to be deducted from that figure.

THE Vienna correspondent of the London *Daily Chronicle* says: "The announcement of a meeting of shareholders of the Prager Eisen Industrie Gesellschaft, one of the most powerful iron concerns on the continent, with a view to the distribution of a reserve fund of £7,000,000 ($35,000,000) clandestinely accumulated in the course of years and never appearing in the balance sheet, has led the government to interfere on the ground that the directors are guilty of stock jobbery. As a result of the order the president of the concern has resigned, and his resignation has been followed by that of two directors of the Credit Anstalt, who have also been directors of the iron company. The scandal has caused an outcry for a reduction, in the iron duties, which have enabled the company to make these enormous profits."

THE manufacturers of sheet and bolt copper have come together after an interval of about two years, during which time the association was organized. A new price list has been issued, showing an advance of half a cent above the former list, which means an advance from prices which have been current, of about two cents. The circular issued to the trade states that the advance in the price of raw copper is responsible for the change. The agreement is claimed to be of such a nature that firm prices can be maintained.

THE Morgan Engineering Co., Alliance, O., has sent out 75 car loads of material, mostly gun carriages, for the Government, during the last five weeks. The plant is being operated night and day.

THE Fosdick Machine Tool Co., Cincinnati, has changed its name to the Fosdick & Holloway Machine Tool Co. John Kyle Holloway is the new partner.

OBITUARY.

Col. James Collord.

At his home in Pittsburg, Dec. 16, Col. James Collord, a veteran of the Civil War, and well known in Pittsburg, in iron and steel circles, died of Bright's disease, aged 62. Col. Collord was treasurer of the Oliver & Snyder Steel Co., and for many years had carried on a brokerage business in pig iron and in steel. Col. Collord was a native of New York City. His father was a Methodist minister. When James Collord was about 17 years old his father died, and he went to Brownsville, Pa., and later to Pittsburg, where he was first employed in the general store of Spang, Chalfant & Co., at Etna, as a clerk. At the outbreak of the civil war he was with A. Bradley & Co., stove manufacturers. He went out as a member of the Pittsburg Rifles. At the second battle of Bull Run he was wounded in seven places by a load of buckshot. His right eye was destroyed, and a buckshot entered the neck almost severing the jugular vein. When the 155th Pennsylvania Volunteers were organized in Pittsburg he was made captain, later becoming a colonel. In 1867 Col. Collord associated himself with R. C. Loomis, in the pig iron brokerage business, the firm name being Loomis & Collord. About 1870 the firm was dissolved by the withdrawal of Mr. Loomis. After that time Col. Collord was at the head of the firms of Collord & Martin, C. A. Martin being the other member of the firm, and Collord & McKeefrey, his partner being William D. McKeefrey. Neither of these firms was long in existence, and about 10 years ago the firm of James Collord & Co., consisting of Col. Collord and William Altsman, was organized, and has continued since.

Henry A. Chapin.

Henry Arthur Chapin, owner of the fee of the Chapin mine at Iron Mountain, Mich., died at his home in Niles, Mich., Dec. 16, aged 85 years. He was born in Massachusetts, and emigrating to Ohio went to school in Portage County, O., later clerking in a general store at Akron, O. In 1836 he located at Niles, Mich., where he opened a store. At his death he was rated the wealthiest man in Michigan. In addition to the fee of the Chapin mine, he had interests in important financial institutions in Chicago and South Bend, Ind., and was the largest stockholder in the Niles and Ohio paper mills both in Niles. He owned much real estate, and his palatial residence in Niles cost over $200,000. The following incident in the history of Mr. Chapin's property is told: The fee of the Chapin was entered some 40 years ago by Mr. Chapin's son-in-law, who was then the editor of the Marquette *Mining Journal*. Mr. Chapin was at that time a prosperous retail merchant at Niles, Mich., and the son-in-law, knowing that he was the owner of a bounty land warrant and some other agricultural land scrip, wrote to him, saying that if he would send the warrant and scrip to him (the son-in-law), he thought he could place them where they would do the most good in later years. The old gentleman sent the warrant, which called for 120 acres, and the scrip, both of which were applied in the location of lands on what is known now as the Menominee range, then an unbroken wilderness. It afterwards transpired that the State had received and used more of this kind of scrip than the amount to which it was entitled, and the entries made with that sent up by Mr. Chapin were canceled. The warrant covered the 120 acres on which the Chapin mine is located, and for which a warrant was duly issued to Mr. Chapin. In the course of time Mr. Chapin failed and turned over to his creditors all his property, including the land in question, receiving only that which was exempt by law from execution. The creditors being anxious to realize as much cash as possible, and deeming the land worthless, or at least unavailable, proposed to Mr. Chapin that if he would turn out $250 worth of exempt property, he might keep the land, which proposition he accepted. What he gained by the transaction, and wha tthe creditors lost, or whoever might have purchased the land, had it been sold on execution, may be partly estimated from the fact that he received over $1,500,000 in royalty, paid him by the lessees.

Morris P. Janney.

Morris P. Janney, an engineer, well known throughout Eastern Pennsylvania, died at his home, in Pottstown, after a lingering illness, on Nov. 30, 1898. He was born in Philadelphia, Feb. 1, 1850. Graduating from the Polytechnic College of Philadelphia, in 1869, he secured a position with the Pottstown Iron Co., at Pottstown. Here he remained for 15 years, rising steadily until he became manager of the company's blast furnaces. In 1886 Mr. Janney became manager of the Glendon Iron Co. and continued in charge of the company's furnaces until 1888, when he returned to Pottstown and took an active share in the management of the business of Janney & Wickersham, iron founders and machinists. About 1890 he again connected himself with the Pottstown Iron Co. as mechanical engineer, and continued to hold that position until ill health forced him to retire from active business.

First Tests of the Gatling One-Piece Gun.

Dr. Richard J. Gatling's new 8-inch, cast steel, one piece gun, which was cast at the Otis Steel Co.'s works, Cleveland, last summer had its preliminary trial at the Sandy Hook proving grounds Dec. 15, before Gen. Miles and his associates on the ordnance and fortifications board. Five rounds were fired, beginning with a charge of 100 pounds of powder and ending with 142 pounds. On the last firing the gun withstood a chamber pressure of 37,000 pounds to the square inch. The tests were entirely successful, and further firing will be carried on from time to time until the $18,600 allotted for the tests is used up. It is expected that 300 rounds will be fired.

Dr. Gatling's estimate is that cast-steel guns can be made for about one-half the cost of built-up guns, and he is sanguine that an appropriation will be made eventually for duplicates of his gun.

Chemical and Metallurgical Handbook.

The second edition of the "Chemical and Metallurgical Hand-book," edited by J. H. Cremer, M. E., and G. A. Bicknell, M. S., of Cleveland, is just from the press, and may be obtained through the Iron Trade Review Co.'s various offices. The volume contains tables, formulas and valuable information, for the use of chemists, metallurgists and mining engineers. In its preparation the general plan of the first edition has been followed presenting in concise form data useful to the chemist and metallurgist. Several tables of the first edition that were of rather limited use have been omitted, and more than 100 pages of new matter added. The latter includes notes on blast furnace practice, outlining the more important theoretical and practical points. Methods for analysis of iron ore, iron and steel, and for assaying, have been given briefly. The hygrometric table is a new feature, the determination of the amount of moisture in the air being a matter whose importance in metallurgical operations is being more and more recognized. The chemical, physical, metallurgical and mineralogical tables are such as are employed in every-day work, giving in small compass what would require ranging over a number of volumes to find. The book is bound in seal and the net price is $3.

Personal.

The resignation of John W. Gates as president of the Illinois Steel Co., presented some time ago, was accepted by the directors last week and will take effect Jan. 1.

Chas. E. White, for a number of years in charge of the Deere & Mansur Co.'s shops, has been appointed superintendent of the works of the Sylvan Steel Co., Moline, Ill., succeeding George H. Tatnall, who has accepted a position with the Illinois Steel Co.

G. H. Carver, for a number of years superintendent of the Piano Mfg. Co., Piano, Ill., is now vice-president and superintendent of the Detroit Malleable Co., which occupies the plant recently vacated by the Michigan Malleable Iron Co.

F. A. Bates, of Drake, Bates & Co., Cleveland, who has been connected for several years with iron mining interests on the Gogebic and Mesabi ranges, leaves Dec. 28, for Cuba, expecting to visit particularly the iron mining properties in the Santiago district. He will be accompanied by his son Mowry Bates, who has been on the Mesabi range for several years, and by John Case, a railroad engineer.

THE Pennsylvania Tube Works, with plant at Soho, Pittsburg, have purchased the machinery in the Duquesne Tube Works plant at Duquesne, from the Carnegie Steel Co., Ltd. who recently bought the whole property.

EUROPEAN IRON ORE SUPPLIES.

The European iron masters have recently become more deeply interested than ever in the question of iron ore supplies, as is natural in a period of active trade, and discussions on this subject are going on in their representative associations and periodicals. Many of the deposits which have been long worked are becoming exhausted, and it is now, or will be soon, necessary to look elsewhere for their raw materials. In Great Britain, where the furnaces have been for years large importers of ores, this is especially the case. At the present time there are four large and important deposits which are looked to for the future, though exploration may in time develop others. Most European countries, with the exception of Russia, have been pretty thoroughly prospected, however, and expectations of new discoveries are only moderate.

The Spanish iron ore beds have been worked in a small way for centuries, but during recent years have been the main reliance of the British furnaces for high grade Bessemer ores. The Bilbao mines are estimated to have yielded over 100,000,000 tons, and are gradually becoming more difficult and expensive to work, as the larger ore bodies are becoming exhausted and the demand increases. These deposits and those of Somorrostro have been valued because of their freedom from phosphorus and other impurities, which makes them especially valuable for steel pig. It is due largely to their quality that the English steel makers have been able to adhere so generally tothe acid processes, both in converter and open hearth steel. Unless new discoveries, which are not now expected, are made, it is thought by good authorities that not more than 10 years' supplies can be looked for, at the present rate of export. Moreover, the cost of mining is increasing as the beds are worked out, and it is evident that the Spanish iron mines are well past their best days.

Of more future importance than the Spanish mines are those of Northern Sweden, the development of which is comparatively recent. At the Grangesberg and in the districts of Gellivara and Kurunavaara, in Swedish Lapland, there are very large deposits of iron ore opened—in the last named districts it is estimated that over 200,000,000 tons are available—and they are so situated that they can be mined easily and the ores can be delivered on deep water with a very short railroad haul. These ores average at least 50 per cent iron, some of them running up to 70 per cent. Their great drawback is the high percentage of phosphorus, which unfits them for the Bessemer process. Some promising experiments have been made in the magnetic concentration of these ores, and in freeing them from a part of their phosphorus. Most British authorities are inclined to look on Sweden as their chief future reliance for ore supply.

The ore deposit of the Erzberg, in Styria, though it is known to have been worked since Roman times, is still apparently far from exhaustion, and promises to be an important source of supply for the Austrian and a small section of the German iron industry for a long time to come. These ores run from 40 to 50 per cent iron and are low in phosphorus. They are cheaply mined, but expensive railroad transportation limits their availability to a comparatively small radius.

The oolitic or minette ores of Luxemburg and Elsass constitute a very important reserve for the German iron industry; and to them are to be added the deposit of similar ores lately discovered at Briey, in French territory. These ores are of a low grade, running usually from 35 to 40 per cent iron, and they carry a high percentage of phosphorus. It is their use which has determined the extensive employment of the basic process by the German steel makers. Over five sixths of the steel made in Germany is basic steel, and this proportion is increasing rather than diminishing. Like the Erzberg ores, the minette ores are not available for export, and their use is limited to Germany, Belgium and a part of France.

Russia has undoubtedly very large iron ore reserves, and is the European country where the greatest future developments may be expected. The mines of the Oural region are the best known and the most extensively worked up to the present time. The Krivoi-Rog deposit in Southern Russia is a very large one, and is being actively developed. In Siberia there are very large deposits of iron ores which have hardly been touched as yet. There are almost unlimited supplies which may be drawn upon in the future as the country is opened up and transportation facilities improved. The Russian iron ores are for the most part located far inland, and are not in any case available for export, so that they cannot enter into any future calculations for Western Europe. Some minor supplies have been drawn from Elba, from some of the Greek islands and from Algeria, but these are all comparatively limited thus far and are apparently capable of only a small development.

British iron masters have seriously discussed the question of importing ores from India, but the distance seems to be a bar in that case. The importation of ores from our own Lake Superior region has also been discussed, but the cost of transportation to the Atlantic seaboard is at present too high to make this probable on any large scale. A much more promising field is found in the island of Newfoundland, whose future capabilities as an iron ore producer are only just beginning to be understood. Attention will doubtless be turned to them before long, as the island is now being opened up by enterprising men, who are interested in exploiting its resources.

The present discussions are only bringing out more plainly the fact that no European country is able to compete with the United States in the cheapness and abundance of its raw materials; and our leadership in the iron trade will become more pronouncec with each year that passes. Russia and China are possibilities of the future; but it will take many years for their full development to come.—[Engineering and Mining Journal.

GOVERNMENT STANDARD FOR CAST IRON.

TO THE EDITOR:

Mr. Ulke's answer to my recent criticism of his use of the word "semi-steel," and his advocacy of the Governmental methods of testing for general adoption in the iron trade, seem to call for further comment. First as to "semi-steel," so-called; I fail to see why the fact that some founders who very properly took advantage of the benefits derived from the addition of steel scrap and who named the product at a time when its constitution was not understood, should cause this name to be retained when it is now known to be nothing but a high grade cast iron. It cannot be defined with exactitude, that is to say, placed in a different category, from cast iron, for it is simply a cast iron with a maximum of strength so far as our present practice goes. The fact that the Government, especially the Patent Office, uses the term, is no criterion, and as to day nearly all founders of prominence use steel scrap to some extent and do not claim special favors in the trade as a consequence, it seems unfair to follow the lead of those who—in plain language—have axes to grind in this regard. Hence my desire to call attention to the fact that it were best to discard a useless term; and scientific men especially should not fall into the way of adopting a designation which is not accepted by any society of standing, and in fact is not needed.

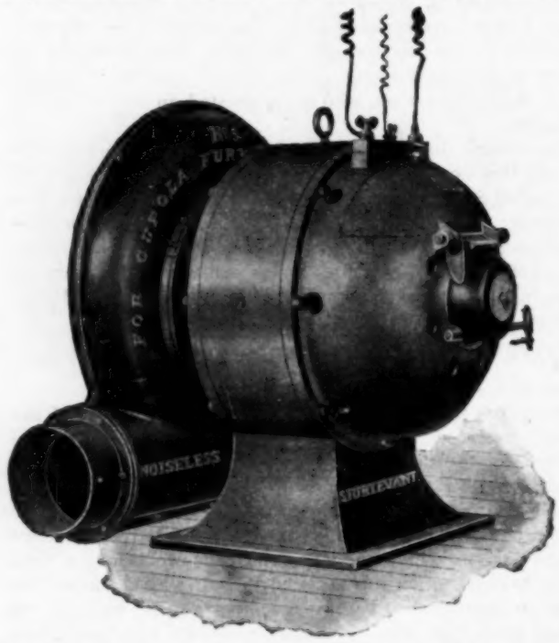
Now as to the Government specifications and methods of testing which Mr. Ulke urges for general adoption in the iron trade: As I do not happen to be a Government inspector, but am rather closely identified with the foundry trade, and know something about the vexatious occurrences which are carefully withheld from outsiders and especially inspectors, I must reiterate that cutting test specimens from normal castings which vary in thickness gives hopelessly discordant results, etc.; and also that attaching a coupon to the casting itself acts similarly. And I will ask Mr. Ulke to remember that he is advocating these methods for the general trade, that is, for all kinds of irons cast under widely differing conditions. It is here that I do feel very pessimistic about Mr. Ulke's recommendations and would point to the fact that the Government gives the remarkably wide limit of 11,000 lbs. per square inch to go on for this so-called semi-steel, and even provides for special tests when the minimum required is not reached by more than 3,000 lbs. If this is the result of thorough practical studies of the conditions encountered, I have nothing more to say.

I do not condemn machined specimens where they are to represent machined castings by any means, but I do condemn them as representing castings in general, for which Mr. Ulke has recommended this method of testing. I will not trespass upon the valuable space of *The Iron Trade Review* any further than simply to state to Mr. Ulke or any other U. S. inspector that in the course of my consulting practice I have been repeatedly asked to indicate the very best methods by which a coupon could be, to put it mildly, improved so that the test specimens would pass the inspector, and in this way cheaper mixutres would equalize unfavorable locations. Further comment is unnecessary. RICHARD MOLDENKE.

AN ELECTRIC PRESSURE BLOWER.

The inconvenience and waste of power which attends the driving of the ordinary cupola blower at a distance from the cupola is well known to the foundryman. If the blower is placed near the cupola, in order to avoid piping and loss of pressure, the chances are that it will require an extended system of shafting to conduct the power to it. If, on the other hand, it is placed near the source of the power, the losses in transmission of air are liable to be excessive. Both these disadvantages are overcome by the adoption of electricity for the motive power, and with its increasing use the opportunity is afforded to the foundryman to avail himself of this advantageous method of driving the fan.

The accompanying illustration shows a new design of electric pressure blower, recently brought out by the B. F. Sturtevant Co., of Boston. It not only contemplates the use of electric power, but also provides for the adjustment of the blower so that it may discharge in any desired direction and thereby save bends in the pipes and losses by friction. To meet the ordinary conditions of the foundry with its atmosphere laden with dust, the motor here shown is entirely closed in a heavy cast iron casing, but it is readily accessible through the door shown. The motor itself is of the multi-polar type carefully designed to avoid sparking or overheating. It is supported on a substantial spreading cast iron base and the fan is attached to the farther end of the enclosing case. It is there so arranged as to be swung about the motor shaft as an axis so that the fan may discharge in any direction desired. The machine is stable and readily portable and can be located to suit any desired conditions. The design is patented.



THE newspaper reports concerning negotiations for the purchase of the Cleveland, Lorain & Wheeling and the Wheeling & Lake Erie roads by the Federal Steel Co. have been officially denied in the past week. An officer of the steel company makes the general statement, in addition, that the company is not now negotiating for any properties whatever, but is attending to details connected with the completion of its organization.

THE next annual convention of the National Association of Manufacturers will be held in Cincinnati, Jan. 24, 25 and 26. It is expected to make this essentially a convention for business, and social features will be entirely secondary. A number of matters of National import are to be reported upon by association committees.

THE American Pig Iron Storage Warrant Co.'s stock in yard Dec. 10, was 159,100 tons, 1,900 tons having been taken out and 200 tons put in yard in the 10 days preceding. It is evident that warrant iron now available for consumption has been practically all taken up.

NATURE AND HISTORY OF PATENT RIGHTS.

The monthly meeting of the Civil Engineers' Club of Cleveland, was held in Case Library, Dec. 13, President Osborn in the chair. Present, 21 members and four visitors. A committee of three was appointed to consider the feasibility of renting quarters for the club in the new building of the Chamber of Commerce.

Mr. Edwin L. Thurston, associate member of the Club, read an instructive paper on "The Nature and History of Patent Rights." He defined the origin and limitation of the rights enjoyed by a holder of letters-patent, showing them to be only such as the statute confers, and nothing by natural right, or common law. The only right secured by a patent to the patentee is the right to exclude or prevent others from exercising their natural right to make out of their own materials the particular invention which the patent covers. Frequently the patentee of an improvement is excluded from the use of his own invention by some prior patent covering the thing improved.

Two theories were discussed as to the nature of a patent right, the one regarding it as a monopoly, the other as a contract between the inventor and the government representing the public. The latter view has been generally accepted by the courts and by Congress in this country. As a contract, its language should be liberally construed so as to give the inventor as complete protection as may be. Considered as a monopoly, a patent is such in form only. It is not an illegal or oppressive monopoly. It deprives no one of any right previously enjoyed because a patented invention must be new. The author described the progress of patent law since the reign of James I., of England in 1623 to the present time. The first patent statute in America went in to effect April 10, 1790, and was entitled "An Act to promote the progress of useful arts." The first patent granted was dated July 31, 1790, and was issued to Samuel Hopkins, for making pot and pearl ashes. This act was replaced by another on Feb. 21, 1793. Other acts were passed in 1819 and 1832. But in 1836 all preceding acts were repealed and the present system was inaugurated. The new act created the patent office, with a commissioner of patents. It provided for the registration of patents, thus affording security to the patentee's title. It also provided for an examination to be made by the commissioner as to the novelty of an invention, and for the establishment of a library of scientific books. This library now contains nearly 60,000 volumes. In 1870 the term of a patent was changed from 14 to 17 years. A new law which went into effect Jan. 1, 1898, provides for the length of time an invention may be known to the public before the inventor loses the right to claim a patent. This law also relates to the effect of a foreign patent upon a United States patent. More than 15 bills are now under consideration by the two patent committees of Congress. An interesting discussion followed.

W. H. SEARLES, Secretary.

THE Pneumatic Crane Co., Pittsburg, has been chartered for the manufacture of all kinds of pneumatic machinery, the capital stock subscribed being $5,000, with privilege of increasing to $5,000,000. The incorporators are Charles S. Guthrie, Richard Hoffman, Jr., David H. McCosh, and S. G. Cooper, all of Naylor & Co., Pittsburg, and William S. Halsey, of Pittsburg. Mr. Halsey in 1895 patented certain inventions in pneumatic machinery, but nothing was done in the matter as Mr. Halsey has only now returned from an extended military service with the Government. The company will do experimental work for the present.

AS HAS been noted, the Uehling method of casting and conveying pig iron will be used at the stacks of the Bellaire Steel Co., Bellaire, O. Contracts have just been let for the equipment as follows: With the Enterprise Boiler Co., Youngstown, O., for the machinery; with W. B. Scaife & Sons, Pittsburg, for the structural work, and with the Weimer Machine Works Co., Lebanon, Pa., for the ladles. G. H. Ginther, of Pittsburg, manager for Uehling's method, has concluded arrangements for installing the system at the two Dunbar, Pa., furnaces of the Dunbar Furnace Co., making mill and foundry iron. The equipment will be a single strand machine, similar to the one now in operation at Anna Furnace, at Struthers, O., of Runyon, Stubbs & Co.

PATTERNS AND CASTINGS AS WITNESSES.

It is quite a common thing for apprentice pattern-makers to be working in shops with which there is no foundry connected, and who therefore have to contend themselves with seeing the castings after they are made, and the patterns after the molding is completed. To many such it may be exercising a new line of thought to consider what a chain of circumstantial evidence is presented by the castings and the patterns relative to what transpires in a foundry, and I will try, for the benefit of those so situated, to mention a few of the commonest facts that the castings and patterns testify to.

Sometimes a small pattern, when made whole, is of such shape that there is seemingly little choice as to which to consider the cope side; but by examining the casting we can tell at once which one the molder chose for that purpose, by noticing the cope or parting line around the casting. This can always be traced in outline on castings made from patterns not parted, unless the entire pattern is in the nowel, and where patterns are parted it is seen around the corresponding place in the casting. On fine work it is scarcely noticeable, but sometimes on poor work this is shown in an unsightly manner, especially when the pattern is not in halves, by the part of the casting not in the cope being distinctly larger all around the cope line, owing to excessive rapping of the nowel. The cope being a straight lift and not rapped leaves this portion of the casting true to the pattern, but the nowel is unduly enlarged.

When we see a casting made from a pattern which was in halves come with one-half distinctly overlapping the other, we may know one of two things: either that the two parts of the pattern did not fit properly, owing to loose dowel pins, or else the trouble arose from a badly fitting flask. Pattern-makers always attribute it to the latter cause.

A solid pattern which sees constant service in the foundry (a pulley for example), frequently shows great wear where the cope parting is made, having the varnish worn away, and a line cut into the wood all around the center line of the spokes in this case. The constant wear of the molder's trowel against the softer pattern is the explanation.

Sometimes it is a little mystifying to the apprentice to see an old pattern completely covered on the cope side with fine dents, which look as though some one had been trying to make a poor job of stippling. This is owing to a too vigorous application of the vent wire in the hands of the molder, who has allowed it to strike through the mold hard enough to bruise the pattern.

Again, he will be perplexed by seeing a hole on the top side of the cope half of a pattern, which looks as though a draw iron had been stuck into it, which is not so far out of the way, after all; but it was really done for a different purpose. This hole will commonly be noticed on patterns which leave the sand very easily (the top half of a valve or pipe pattern for example), and is done by sticking a rod into the pattern, and securing it to the cope half of the mold, so that when the cope is lifted the half pattern will be sure to rise with it, and not start to loosen before the proper time and endanger the work. After the flask is turned, of course, the rod is removed, and the pattern lifted out in the regular way.

When core boxes are returned from the foundry having holes in various places through their sides, or ends, it show where the core maker had to vent the core, these holes being bored to admit rods for the purpose This is something the pattern-maker need not trouble himself about, as he is not expectedto do it, and, besides, only certain forms and shapes of core boxes require it.

A casting readily shows whether it was pickled, rattled, or made in facing and not pickled; for if pickled, it shows rust all over, from the acid and water of which the pickle is composed; if rattled, it is worn smooth and the corners are more or less blunt where it constantly fell among other pieces as it revolved in the tumbling barrel. If cast in a properly faced mold the sand easily peels away from it, and when cleaned the iron is left in its natural color.

A pattern-maker should always bear in mind that the cleanest and best iron will be in the nowel, as the dirt and impurities will rise, and oftentimes when a perfectly clean, machined surface is required that part of the pattern must be taken for the nowel, even if it will not mold as easily that way: or else the flask must be turned over, and the mold poured the other side up. Where such precautions are necessary, it is common practice to mark "cope" on that part of a pattern which must be considered as such when the molder would naturally consider it the opposite. Then he can use either of the two methods he chooses that I have just mentioned to get a certain part of the casting in the bottom of the mold.

I think that foundries, as a general rule, are quite willing to accommodate in such particulars, in order to have finished surfaces come with clean iron, but the pattern-maker must not imagine that a foundryman who has never seen a drawing of the machine or part, can tell by intuition where any such foresight is required, unless the pattern is marked.

Another fact that a casting bears witness to is the gating. The place where the gate connects with the mold can be readily traced, and it is interesting to note the difference in size and position on various kinds of work and in different metals. Steel castings, for example, will show gate stubs several times larger in section than would be necessary for the same piece in cast iron. Thin castings, like a common stove spider, for example, will frequently show a place two or three inches long or more, and almost a mere line in width, on the middle of the outside surface, i. e, the cope side of the casting. In these the iron is poured directly through a flat sprue into the mold, and the line which we see is the place where the sprue is broken off; whereas in most small machinery castings the iron is poured into a round sprue, from which a gate is cut to the edge of the mold, and no trace of the sprue itself is visible. It is common on a casting containing a large body of iron, to see a round spot an inch and upward in diameter chipped off smooth to match the surrounding surface on the cope side. This is more apt to be the trace of a riser than of a sprue.

Many castings having quite a body of iron will show bulging places on the sides, sometimes in patches and sometimes over a large surface. This may show that the mold was not rammed hard enough, but generally it tells the tale of straining, owing to the weakness of the wooden flasks in which they were molded, especially if the flasks were old and not very strong. If a casting is poured with cold and sluggish iron this will be plainly indicated by seams, called cold shuts, and these, with rounded and imperfectly filled corners, are the result. Sometimes on a column or similar casting, having a large core, we see on the outside small, round bunches or buttons which were not on the pattern. These are done by the molder pressing the end of his trowel handle into the mold in the spot where he places a chaplet to make the core secure. What often appears to be nails showing in a casting, over or under a core, are but the remains of chaplets which did not melt perfectly in the body of iron that surrounded them. These do not appear, however, unless the casting is of such shape that further support and anchoring are required for the core than is given by the core prints.

Finally, to return to patterns, if we see a large and badly worn hole on one that is used constantly, in the place where it was lifted from the sand, it says "draw plate" plainer than any words, and I know that many a pattern suffers from this cause to such an extent that repairs far outbalance the cost of draw plates in the beginning.—[John M. Richardson in American Machinist.

The Alabama Steel & Shipbuilding Co., erecting a large open-hearth plant steel at Ensley, Ala., placed an order last week with the newly-formed Mesta Machine Co., Pittsburg, for the tables and hydraulic manipulators for the 44-inch blooming mill. The same concern received an order last week from the Illinois Steel Co. for two 15-ton hydraulic ladle cranes for the Bessemer department of the South Chicago works and an order from the Cumberland Steel & Tin Plate Co., Cumberland, Md., for a bar shear for the soft center steel department.

It is stated that Sylvester Patch, of Richmond, Va., William McKinley, Pittsburg, of the McKinley Coal Co., and others, have formed a company to manufacture fireproof cement from furnace slag, having purchased the plant of the Pittsburg Mortar & Supply Co., at 26th and Smallman sts., Pittsburg, for the purpose.

AMERICAN TIN PLATE CO.

The general organization of the American Tin Plate Co., the tin plate consolidation, was effected in Chicago, last week, at a general meeting of the stockholders The charter was issued under the laws of New Jersey providing for $20,000,000 preferred 7 per cent cumulative stock and $30,000,000 common stock The promoters are to receive $10,000,000 of the common stock, and $2,000,000 of each will remain in the treasury, leaving $18,000,000 of common and preferred, which have been issued, share for share, in payment for the plants absorbed and for some of the stocks on hand, and for cash to furnish working capital and pay for plants which were bought for cash, and for stocks at the mills. The meeting occupied the greater part of last week, and a vast amount of detail work was gone through with, as the inventories of stocks on hand at the different mills had to be gone over and approved. Only the general officers, directors, etc., were elected. Besides the officials already chosen, there will be a general purchasing agent, with assistants, and a general manager, with a number of district managers. The individual management at most of the plants will be left much as it is. The plants are being started in operation as rapidly as possible, all having been shut down for the inventory. The general headquarters of the company will be located in Chicago, and it is probable that practically all of the business will be done there, branch offices being located at other points for the management of the groups of mills.

The public is most interested in the new company's buying and selling policy, but those at the head of the enterprise either have not succeeded in formulating satisfactory plans in this connection, or are keeping the plans formed to themselves. It has been stated that arrangements have been made, or will be, with certain one or two of the bar mills looking to a supply of cheap bars, but this cannot be confirmed, and it seems certain that if such a thing were done the other bar makers would lend assistance too readily to new tin mils, which would be consumers of their product. The story that the consolidation will erect a steel works and bar mill of its own is evidently unfounded, as some of the present bar makers are well known to be looking for further finishing lines to consume their product, and they could add tin plate works to their mills in a much shorter time than the consolidation could erect a bar mill and steel works. There is some gossip in the trade as to the bar makers forming a combination for their own protection, it being held that with but one purchaser such an arrangement could readily be formed and kept in successful operation. Were it not for the sheet manufacturers, who purchase practically the same material as the American Tin Plate Co. will, this could readily be done, but as matters stand there are several complications to be taken into account, and the bar combination talk may have been started merely as a "feeler" to bring the tin plate combination to a declaration.

PERSONNEL OF THE MANAGEMENT.

Daniel G. Reid, the president, has been treasurer of the old American Tin Plate Co. since its formation in 1891. His residence has been at Richmond, Ind., near Elwood, where the general offices and principal plant of the old American Tin Plate Co. was located. He has been president since its formation of the Tin Plate Makers' Association of the United States, which was organized quietly in February, 1897, to succeed the former organization of tin plate manufacturers. He has been from the beginning of the combination negotiations a constant supporter of the movement, and has been the closest of the manufacturers to Judge Moore, although his connection was not publicly known. Wm. B. Leeds, the first vice-president, is an old railroad man, and has been president of the old American Tin Plate Co. since its organization. The second vice-president, Wm. T. Graham, is president of the Aetna-Standard Iron & Steel Co., of Bridgeport, O., which sold its tin plate department to the combination, and still has a very extensive plant at Bridgeport, O., producing sheet and galvanized iron, plates, bands, light shapes, etc.; a steel mill at Mingo Junction, O., which is being rebuilt and will have a capacity of from 300,000 to 400,000 tons of slabs, billets, sheet bars, etc., and two blast furnaces at Mingo Junction, besides leasing one at Steubenville. Mr. Graham was president of the old association of tin plate makers, which was wound up after the formation of the new association early last year, and is now vice-president of the Iron and Steel Sheet Manufacturers' Association. The third vice-president, Warner Arms, was president of the Falcon Tin Plate & Sheet Co., Niles, O., which sold its tin plate plant to the combination, and is president of the Falcon Iron & Nail Co., an allied interest, making sheet and galvanized iron, skelp, etc. The treasurer, F. S. Wheeler, was secretary and treasurer of the Great Western Tin Plate Co., of Chicago, and took a very active part in the consolidation negotiations, being constantly associated with Judge Moore. Wm. F. Dutton, the secretary of the new concern, was secretary and treasurer of the Star Tin Plate Co., Pittsburg, owned mainly by Mackintosh, Hemphill & Co., and was in fact manager of the business as well. E. G. Applegate, who is assistant to both secretary and treasurer, was secretary of the Monongahela Tin Plate Co., of Pittsburg. He will be located in Chicago. W. P. Beaver, formerly secretary of the Pittsburg Tin Plate Works, New Kensington, Pa., is auditor. The executive committee is composed of W. B. Leeds, chairman, D. G. Reid, Warner Arms, W. T. Graham and W. H. Moore, the last named being the promoter of the consolidation.

The board of directors consists of D. G. Reid, W. H. Moore, W. B. Leeds, W. T. Graham, James H. Moore James McLean, James B. Dill, F. S. Wheeler, Warner Arms, George Greer, Wm. H. Donner, Cecil A. Robinson, Wm. E. Reis, James A. Mathews, and Richard R. Quay. James H. Moore is a brother of Judge Moore, and has assisted greatly in the work of consolidation. George Greer was president of the New Castle Steel & Tin Plate Co., New Castle, Pa., which had one of the very largest and best equipped mills in the country, and was general manager of the business. Wm. H. Donner was one of the youngest and most progressive men in the tin plate business. He was treasurer of the National Tin Plate Co., of Anderson, Ind., but has been at Monessen, Pa., since the middle of last year building and subsequently operating the plant of the National Tin Plate Co. of Pennsylvania, of which he was president. C. A. Robinson is president of the La Belle Iron Works, Wheeling, W. Va., which sold its tin plate plant to the combine, but still has a plant for making nail plate or skelp, and cut nails. Wm. E. Reis is president of the Shenango Valley Steel Co., New Castle, Pa., which sold its almost completed 30-mill tin plate plant to the combine, and still has an extensive steel works, with a recently completed sheet bar mill, and a large wire rod, wire and wire nail works, which it refused to sell to the recently formed wire combination. James A. Mathews was secretary and treasurer and virtually manager of the Crescent Sheet & Tin Plate Co., Cleveland. Richard R. Quay was vice-president and treasurer of the Monongahela Tin Plate Co., Pittsburg, in which the Olivers were also interested, and was connected with the negotiations which led to the formation of the consolidation. He is a son of the senior senator from Pennsylvania, M. S. Quay. Of the 15 directors, one is James B. Dill, a corporation lawyer, practicing in New York City, and the resident director at Trenton required by the New Jersey incorporation laws. Another is James McLean, of Phelps, Dodge & Co., New York, this firm being one of the big four of dealers and importers and a heavy holder in the New Castle Sheet & Tin Plate Co., and the Shenango Valley Steel Co. The other 13 directors, except the Moore Brothers, have been manufacturers. In selecting the gentlemen to control the business of the American Tin Plate Co., the greatest effort was made to harmonize all interests, and it has certainly been as successful as could be expected. Two of the country's few sheet bar mills are represented, while the most careful attention was paid to those concerns which sold tin plate outfits to the combine and still had sheet or other mills left, to which the manufacture of black plate or tin plate could easily be added.

PROVISIONS OF THE CHARTER.

The charter of the American Tin Plate Co. contrasts in important particulars with that of the Federal Steel Co. The latter represents extreme centralization of power; the former puts the control of the business in the hands of the stockholders. The power given the board of directors of the Federal Steel Co. is absolute. They have power, "without the

assent or vote of the stockholders, to make, alter, amend and rescind the by-laws, to fix the amount to be reserved as working capital, to authorize and to cause to be executed mortgages and liens upon the real estate and personal property of the corporation, and from time to time to sell, or otherwise dispose of, any or all the property of the corporation," the only check being the requirement of a two-thirds vote of the board of directors. Further, the board of directors, by majority vote, may designate three or more directors to constitute an executive committee, which committee "may exercise the power of the board of directors in the management of the business and affairs of the corporation."

The American Tin Plate Co.'s charter is as follows:

First. The name of the corporation is the "American Tin Plate Company."

Second. The location of its principal office in the State of New Jersey is at No. 525 Main st., in East Orange, County of Essex, and is to be registered with the New Jersey Registration & Trust Co. The said Trust Co. is the agent therein and in charge thereof, and upon whom process against this corporation may be served.

The corporation shall have power to conduct its business in all its branches and have one or more offices, and unlimitedly to hold, purchase and convey real and personal property, both within and without the State of New Jersey, and in all other States, Territories and Colonies of the United States, and in all foreign countries and places.

The officers of the corporation shall have no power to mortgage its real property except upon the consent in writing first obtained of the holders of a majority of the issued preferred stock hereinafter described, or upon the affirmative vote of a majority of the holders of the said preferred stock at a meeting duly called for that purpose, and upon such consent so obtained, or upon such affirmative vote so had, and not otherwise, the corporation shall have like power to mortgage its real property to secure an issue of bonds or otherwise.

Third. That the objects for which, and for each of which, this corporation is formed, are: To manufacture, buy, sell, deal in and with tin, terne, black plates, steel sheets, and all like or kindred products, to mine, manufacture, prepare for market, market and sell the same, and any articles of product in the manufacture or composition of which metal is a factor; including the acquisition by purchase, mining, manufacture or otherwise of all materials, supplies and other articles necessary or convenient for use in connection with and in carrying on the business herein mentioned, or any part thereof.

In furtherance, and not in limitation, of the general powers conferred by the laws of the State of New Jersey, it is hereby expressly provided that the company shall have also the following powers, that is to say:

(*a*) To manufacture, purchase, or otherwise acquire, hold, own, sell, assign, and transfer, invest, trade, deal in and deal with goods, wares and merchandise and property of every class and description, and to do both mining and manufacturing of any kind.

(*b*) To the same extent as natural persons might or could do, to purchase or otherwise acquire, to hold, own, maintain, work, mine, develop, to sell, convey, or otherwise dispose of, without limit as to amount, within or without the State of New Jersey, and in any part of the world, real estate and real property, and any interest and rights therein.

(*c*) To acquire the good will, rights and property of all kinds, and to undertake the whole or any part of the assets and liabilities of any person, firm, association, or corporation, and to pay for the same in cash, stock of this corporation, bonds or otherwise.

(*d*) To apply for, obtain, register, purchase, lease, or otherwise acquire, and to hold, own, use, operate, introduce, and sell, assign, or otherwise dispose of, any and all trademarks, trade names and distinctive marks, and all inventions, improvements and processes used in connection with or secured under letters patent of the United States or elsewhere, or otherwise, and to use, exercise, develop, grant licenses in respect of, or otherwise turn to account any such trademarks, patents, licenses, concessions, processes and the like, or any such property, rights and information so acquired, and with a view to the working and development of the same, to carry on any business, whether mining, manufacturing or otherwise, which the corporation may think calculated directly or indirectly to effectuate these objects.

(*e*) To make and enter into contracts of every sort and kind with any individual, firm, association, corporation, private, public, or municipal, body politic, and with the Government of the United States, or any State, Territory or Colony thereof.

(*f*) To do all and everything necessary, suitable or proper for the accomplishment of any of the purposes or attainments of any one or more of the objects herein enumerated, or which shall at any time appear conducive or expedient for the protection or benefit of the corporation, either as holders of, or interested in any property, and in general to carry on any business, whether manufacturing, mining or otherwise.

(*g*) To do any or all of the things herein set forth to the same extent as natural persons might or could do, and in any part of the world, as principals, agents, contractors, trustees, or otherwise.

It is the intention that the objects specified and clauses contained in this third paragraph, shall, except where otherwise expressed in said paragraph, be nowise limited or restricted by reference to or inference from the terms of any other clause of this or any other paragraph in this charter, but that the objects specified in each of the clauses of this paragraph shall be regarded as independent objects.

Fourth. The total amount of the capital stock of said corporation is to be fifty million dollars ($50,000,000), divided into five hundred thousand (500,000) shares of one hundred dollars ($100) each. Of the said stock, two hundred thousand (200,000) shares, amounting at par to twenty million dollars ($20,000,000), are to be preferred stock, and three hundred thousand (300,000) shares, amounting to thirty million dollars ($30,000,000), are to be common stock. The rights, privileges and conditions following shall attach to the shares aforesaid, that is to say:

(1) The common stock shall be subordinate to the rights of the preferred stock except that both preferred and common stock shall have equal voting powers.

(2) The corporation shall not be at liberty

(*a*) To create or issue any other or further shares ranking in any respect *pari passu* with or in priority to the aforesaid issue of two hundred thousand (200,000) preference shares.

(*b*) Nor to create any charge, except as herein provided, upon the net profits of the corporation which shall not be subordinate to the rights of the preference shares.

(*c*) Nor to reserve a surplus fund which shall not be chargeable with the payment of the accrued dividends on the preference shares.

(3) The said preference shares shall carry a fixed cumulative preferential dividend at the rate of, but never exceeding, seven (7) per cent per annum on the par value thereof, and such dividends shall be declared quarterly on the second days of January, April, July and October in each year or at such other time as the board of directors or the executive committee shall see fit and determine. If in any year dividends amounting to seven (7) per cent per annum shall not be paid on such prefered stock, the deficiency shall be a charge on the net profits, and be payable, but without interest, before any dividends shall be paid upon or set apart for the common stock.

(4) The balance of the net profits of the corporation, after the payment of said cumulative dividend at the rate of seven (7) per cent per annum to the holders of the preferred stock, may be distributed as dividends among the holders of the general or common stock, as and when the board of directors or the executive committee shall in their discretion determine.

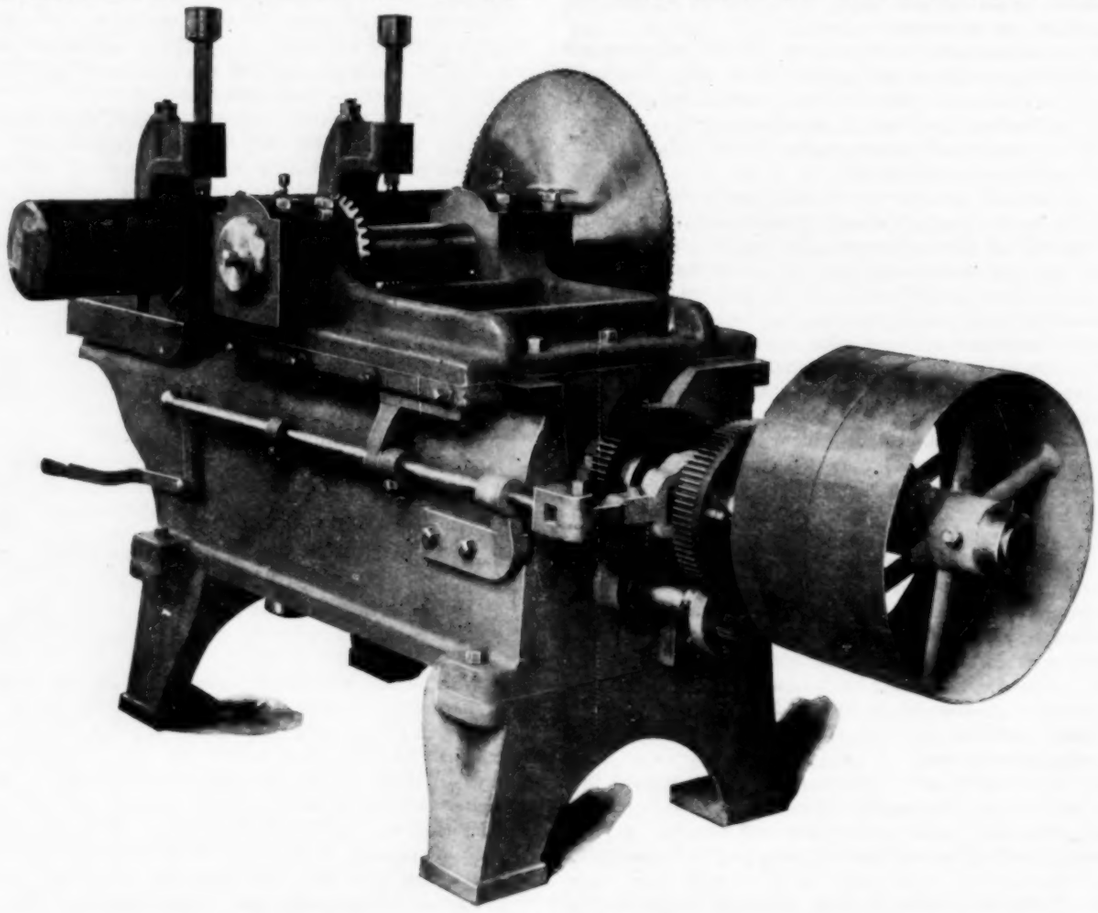
(5) In the event of the liquidation or dissolution of the corporation the surplus assets and funds thereof shall be applied in the first place in repaying to the holders of the aforesaid cumulative preference shares the full amount of the principal thereof, and the accrued dividends, if any, charged before any amount shall be paid upon the common stock, and after such payment in full to the holders of said cumulative preference shares, the surplus assets and funds shall belong to and be divided among the holders of the other shares. From time to time the preferred and common stock shall be issued in such amount and proportion as shall be determined by the board of directors, in accordance with the laws of the State of New Jersey.

Continued on page 18.

NEW Q & C POWER SAWING MACHINE.

To meet the requirements of metal workers, street and steam railways, and manufacturers who cut large quantities of steel rails, tool steel, bar iron, steel shafting and other material ranging in size from three to eight inches round and square, the Q & C Co., of Chicago, has manufactured a new special cold saw. The blade is 25 inches in diameter, one-quarter inch thick, is provided with teeth and is arbor driven. Other details are as follows: Weight on straight base, about 3,000 lbs.; floor space, occupied, 2½x7 ft.; amount of power required to run, from 2½ to 3½ h. p.; saw blade, 25 inches; saw blade available for work, 8¼ inches; diameter of collar 8½ inches; revolutions of saw blade per minute, 11; travel of saw carriage, 10 inches. The feed is automatic, to suit varied requirements.

Where it is desirable to cut large quantities of steel rails, bar iron, shafting, etc., a special chuck for holding from three to six pieces at a time is provided, reducing the time necessary to clamp the work, as well as to make a cut, and insuring



NO. 11. POWER SAW.

good results where blades are kept in good cutting condition. A series of tests in cutting steel rails was recently made on one of these machines, the result showing 160 cuts with scarcely any perceptible dullness of saw blade. This indicates the large amount of work that can be done without stopping to grind, as well as the long life of the saw blade under proper conditions of care and handling.

These machines are supplied with automatic quick return of carriage after completing a cut. They are furnished in any form desired on cabinet base, or as shown in the illustration.

The blades used can be re-sharpened. A special automatic grinder is furnished at small additional cost, which is not only adapted for doing this work rapidly and accurately, but will work well on all kinds of blades used for metal cutting. The automatic grinder, a valuable device in itself, is furnished with the power sawing machines when desired and is also sold to the trade separately.

IN November, the Pennsylvania Steel Co., Steelton, Pa., had 5,399 names on its pay roll.

OUTLOOK FOR EXPORT TRADE IN COAL.

Bids for 120,000 tons of coal for railway use were lately opened in Rio Janeiro. The figures at which Virginian and Welch coal were offered are interesting because they show what opportunity American coal has for competing in a market far distant from the United States. Five bidders offered Cardiff coal at from $6.99 to $7.72. There were four bids for American coal as follows: Tom's River, $6.28; New River, run of mine, $6.79; Virginia, $6.93; Pocahontas, $7.96, provided that the Government would waive the condition that not more than five per cent should be of small coal of 30 cubic inches. Mr. Seeger, our consul, says that the American coal was at least equal to if not superior to the best Cardiff coal, and he quotes a Brazilian paper to the effect that the present is an opportune moment for American coal interests to enter into permanent competition in South America with the Welsh mines. On the other hand, an Argentine paper says of some of the best Virginia coal delivered there that if it be not better screened there is likely to be much complaint from buyers. "The samples we have seen," it continues, "contain too much dust for any practical purpose, and we presume that more care in the shipments will be taken in the future if there be a disposition on the part of those interested to cater for a hold in this market." It will be observed above that the bidder for New River coal offers it unscreened, and the bidder for Pocahontas only offers to supply if the regulation against small sizes be waived.—[New York Journal of Commerce.

Laughlin & Co., Ltd., Pittsburg, are installing the Uehling method of casting and conveying pig iron at the Eliza Furnace, which is being remodeled. The machine will have a capacity to handle 1,000 tons of metal a day. The system will be installed, also, at the other two of the Eliza furnaces, as they are remodeled in turn, and at the new furnace which is to be built. While direct metal is used ordinarily from these furnaces, the metal must be cast Sundays, holidays and when the steel department is otherwise shut down, and on account of the difficulty in securing labor on these occasions the mechanical method is almost as important as when all the furnace product is to be cast.

SCAFFOLDING IN BLAST FURNACES.

From the second edition of the "Chemical and Metallurgical Handbook" of Cremer and Bicknell, just issued, we take the following extract from the chapters on blast furnace practice:

When a furnace does not admit the blast freely at its normal pressure, and the stock does not descend so that no more material can be charged, the furnace is said to be "scaffolded," or in furnace parlance "hanging," or "sticking." When the trouble is serious, the blast pressure at the tuyeres is extremely high, frequently amounting to 16 to 18 pounds or more; practically no wind enters the furnace and no gas appears at the top; the operation of the furnace is virtually at a standstill. The high pressure is a severe strain on the engines, and, if not relieved, may cause a rupture in the shell of the stoves. This condition of bad working is not infrequent, and often occurs without any apparent reason, the furnace previous to the trouble being in good condition and working well.

No satisfactory explanation has been given of the cause of "scaffolds." W. Van Vloten (Stahl und Eisen, 1892), has advanced the theory of excessive carbon deposition ($2CO = CO_2 + C$) in the upper part of the furnace, creating an obstruction to the flow of gas. This theory, however, does not afford an entirely satisfactory explanation of the rapid increase in pressure which is an almost invariable effect of "scaffolds," since from experimental evidence on carbon deposition we would expect a very gradual increase in the blast pressure to occur.

Scaffolding is a peculiarity of hot blast furnaces only, with furnaces using cold blast this trouble is unknown. The effect of very hot blast is to restrict the zone of maximum temperature to a comparatively small space in the region of the tuyeres. If from any cause the temperature of the blast is lowered, this zone of maximum temperature will extend further up in the furnace, causing the formation and fusion of slag at a higher level than before. If now, as a result of increased temperature of the blast, or of other causes, the zone of maximum temperature drops to its former level, the slag and other material which has been fused or partially fused at this higher level will solidify, obstructing more or less completely the flow of the gas.

The above theory, while not susceptible of actual proof, presents a fairly reasonable explanation of the formation of "scaffolds." The most efficient remedy for "scaffolding," or "hanging" is a decrease in the temperature of the blast. If the trouble is not severe, a reduction in the temperature of the blast a few hundred degrees will gradually restore the furnace to normal working. The addition of hard ore or manganiferous ore to the burden is also of advantage to prevent the formation of "scaffolds." The trouble may be more serious, however, so that cold blast does not remedy it, the furnace refusing to take any wind. In this case the cinder notch may be taken out, and stock blown out through this opening, till a considerable space below the scaffold is cleared away. The pressure from the weight of stock above the scaffold may then be sufficient to dislodge the chilled material. "Jerking" the furnace by suddenly taking off the blast may sometimes dislodge scaffold also. Furnaces with high steep boshes, working easily reducing ores with high temperature of blast, and furnaces which have been shut down for some time are particularly subject to scaffolds. Other circumstances which promote the formation of scaffolds are "fast driving," sudden difference in amount of moisture in air, weak, easily friable fuel.

As already stated, the best remedy for scaffolds is the application of cold wind, which raises the level of the melting zone.

When a furnace becomes scaffolded frequently, the most economical practice is to "blow out" and change the lines reducing the angle of the bosh. An instance may be cited of a European furnace whose lines were not well adapted to the class of ore used, the boshes being rather too steep, and, although well equipped with stoves, it was found necessary to keep the blast at a temperature not higher han 360 degrees C. (680 degrees F.), since at higher temperatures the furnace would "stick" and "hang" badly. This condition continued throughout its entire blast, necessarily resulting in an increased fuel consumption and decreased product. It would doubtless have been much more economical to have put the furnace out of blast and changed its lines.

Chilled Furnace.—The bosh walls of a furnace become lined with a conglomerate accumulation of slag, carbonaceous matter, coke, iron, lime, etc., and in the case of old furnaces or furnaces working irregularly, this conglomerate may become of considerable thickness, amounting to several tons of material.

By reason of a displacement of the heat in the furnace, or a change from a refractory to a more fusible or siliceous cinder, a part of this conglomerate lining may be detached suddenly from the walls of the furnace, adding to the burden a large excess of material to be melted, for which no extra fuel is provided. The cooling effect of this large amount of unmelted material will partly solidify all liquid material in the hearth and zone of fusion, closing up the tuyeres and cinder notch and preventing the blast to enter the furnace and the cinder to be drawn. If the chill around the tuyeres is not serious, the tuyeres and cinder notch may be opened by drilling through the mass with steel bars. But if the quantity of this conglomerate lining which has slipped down is very large, amounting to say 10 or 20 tons, the chilled mass in the hearth can only be removed by melting. This is most effectively done by the hydrocarbon or kerosene blow-pipe, one of which is placed in front of one of the tuyeres and another at the cinder notch, the cooler being protected by a covering of clay. After some hours, according to its thickness, the material will be melted away. As soon as the cinder notch and one tuyere are open, the blast may be put on the furnace again, and the other tuyeres will gradually clear themselves.

When charging is resumed, extra fuel should be added to the burden to allow the furnace to rapidly regain its normal temperature. This accident of chilling by sudden slip of wall lining does not happen often, and with new furnaces is not usually serious, but with old furnaces whose bosh walls are worn, giving room for accumulation of such conglomerate obstruction, the accident is not unusual.

RECENT sales of Cochrane separators are reported as follows, by the Harrison Safety Boiler Works: Standard Oil Co., Whiting, Ind., 6-inch oil-ammonia; De La Vergne Refrigerating Machine Co., New York, two 5-inch oil-ammonia; Buckeye Engine Co., Salem, O., 5-inch vertical; Bailey Estate, Boston, one 3-inch and one 4-inch horizontal; Montgomery Ward & Co., Chicago, one each 12-inch, 7-inch and 4-inch horizontal; Parke & Lacy Co, San Francisco, Cal., one each 3½-inch and 5-inch horizontal and one 5-inch vertical; Theo. A. Koch Co., Chicago, two 2-inch and one 6-inch horizontal; Brown Bldg., St. Louis, Mo., three 4½-inch and one 3-inch horizontal; Washington Coal & Coke Co., Star Junction, Pa., two 6-inch horizontal; Fred. W. Wolf Co., Chicago, 4½-inch horizontal; Jung Brewing Co., Cincinnati, O., one each 5-inch and 6-inch oil-ammonia; W. A. Case & Co., Buffalo, N. Y., one 5-inch horizontal and two 4-inch vertical; Arnold Elec. Power Station, Chicago, 12-inch horizontal; Larkins Soap Works, Buffalo, one each 8-inch and 3-inch horizontal; Buffalo (N. Y.) Bellevue & Lancaster R. R., 8-inch horizontal; Lorain (O.) Steel Co., 18-inch horizontal; Shenango Valley Steel Co., New Castle, Pa., 6-inch horizontal; Pejepscot Paper Mills, Brunswick, Me., two 10-inch horizontal; Kent & Stanley Co., Providence, R. I., 8-inch horizontal; Diamond Ice Co., Wilmington, Del., 5-inch vertical; U. S. Navy Yard Washington, D. C., two 6-inch vertical; Cleveland, Cincinnati, Chicago, & St. Louis R. R. Co., Urbana, Ill., one 5-inch and two 3-inch vertical; Oxford Light Co., Norway, Me., 8-inch horizontal; Board of Prison Commissioners, Nashville, Tenn., 3-inch horizontal; Buffalo (N. Y.) Refrigerating Machine Co., 3-inch horizontal; Coe Brass Mfg. Co., Ansonia, Conn., 6-inch horizontal; So. Covington & Cincinnati St Ry. Co., Newport, Ky., 4-inch horizontal; Bowles & Warwick, Richmond, Va., 3½-inch; Edison Elec. Ill. Co, Brockton, Mass., two 6-inch horizontal; Kroeschell Bros. Co., Chicago, 16-inch horizontal; Providence (R. I.) Dye, Bleach & Cal. Co., 4-inch horizontal; Wadena (Minn.) Elec. Lt. Plant, 6-inch horizontal; J. S. Bartholomew, Grand Forks, N. Dak., 3-inch horizontal; Penna. Steel Co., Steelton, Pa., 3-inch horizontal; Northwestern Mining & Exchange Co., Brockwayville, Pa., 8-inch horizontal; Standard Steel Works, Burnham, Pa., 12-inch horizontal.

AMERICAN TIN PLATE CO.—Continued from page 15.

Fifth. The directors of the corporation shall be divided into five classes, equal in number, in respect to the time for which they shall severally hold office. The first class shall be elected for a period of five years, the second class for a period of four years, the third class for a period of three years, the fourth class for a period of two years, and the fifth class for a period of one year; and at each annual election after 1898 the successors to the class of directors whose terms expire in such year shall be elected to hold office for five years so that the term of office of at least one class shall expire in each year. If the number of directors be increased, the directorships thus created shall be and be construed as vacancies to be filled by the board.

Sixth. The names and the postoffice addresses of the incorporators, and the number of shares of common stock subsrcibed for by each, the aggregate of which ($10,000) is the amount of capital stock with which this corporation shall commence business are as follows: James B. Dill, 27 Pine st., New York, 90 shares; Howard K. Wood, 525 Main st., East Orange, N. J., 5 shares; Duncan T. McLaren, 525 Main st., East Orange, N. J., 5 shares.

Seventh. The duration of the corporation is to be perpetual.

Eighth. 1. The board of directors shall have power without the assent or vote of the stockholders to make, alter, amend and rescind the by-laws of this corporation, and, subject always to the payment of the dividends on the preferred stock, to fix the amount to be reserved as working capital.

2. With the assent in writing or pursuant to the vote of the holders of two-thirds of all the stock irrespective of class issued and outstanding, the directors shall have power and authority to sell, assign, transfer, convey or otherwise dispose of the property and assets of this corporation, as an entirety on such terms and conditions as the directors shall deem fit, right and just.

3. The board of directors, and when the board is not in session the executive committee, in addition to the powers and authorities by statute and by the by-laws expressly conferred upon them, are hereby empowered to exercise all such powers and do all such acts and things as may be exercised or done by the corporation, but subject, nevertheless, to the provisions of the statute, of the charter, and to any regulations that may from time to time be made by the stockholders; provided, that no regulations so made shall invalidate any provisions of this charter, or any prior acts of the directors or executive committee which would have been valid if such regulations had not been made.

4. There shall be an executive committee of five members, who shall be elected by the stockholders from the directors, and hold office as hereinafter provided. The said committee shall have and exercise all the powers expressly conferred upon it by this certificate of incorporation, and also all the powers of the board of directors whenever a quorum shall fail to be present at any stated or other meeting of the board, and as well at all times whenever the board shall not be in session, and shall have power to affix the seal of the corporation to all papers which they may deem to require it.

The committee shall have power to make rules and regulations for the conduct of its business, and to determine how many members thereof shall constitute a quorum. The officers of the committee shall be a chairman, a vice-chairman and a secretary, who shall hold office during the term of their office as members of the committee, and shall be elected by the stockholders. At all meetings of the committee all questions shall be decided by a majority of votes, and in case of an equality of votes, the chairman, and in his absence the vice-chairman, and in the absence of both, the secretary shall have a second and deciding vote.

The stockholders shall, at their first meeting, elect by ballot the said committee of five members from the directors elected at such meeting, and the said officers thereof. The stockholders shall determine and fix the compensation to be paid to the members of the committee and to any of the officers thereof as such. At every annual meeting after the first meeting, whenever the term of office of any member or officer of the committee shall expire, the stockholders shall elect a successor. Any member of the committee may be elected to succeed himself.

Any director, irrespective of class, is eligible to election as a member of the executive committee. The term of office of each member of the committee shall be co-extensive with the term of his office as director, unless the stockholders at the time of his election shall fix a shorter period or term of office, which they shall have power to do. Any member of the committee who shall cease to be a director of the company shall *ipso facto* cease to be a member of the committee. Members of the executive committee shall not be subject to removal for any cause by the board of directors or otherwise, and shall hold office until their successors are elected and qualified. All vacancies in the executive committee shall be filled, for the unexpired term, from the directors by the remaining members of the committee.

5. The directors shall from time to time determine whether, and to what extent, and at what times and places, and under what conditions and regulations, the accounts and books of the corporation, or any of them, shall be open to the inspection of the stockholders; and no stockholder shall have any right to inspect any account, or book, or document, of the corporation, except as conferred by statute of New Jersey, or authorized by the directors.

6. The directors shall have power to hold their meetings, to have one or more offices and to keep the books of the corporation (except the stock and transfer books) outside of this State, at such places as may from time to time be designated by them.

CONDITION OF BLAST FURNACES OF U. S.*

Dec. 1, 1898.

Location of Furnaces.	Coke and Anthracite					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	11	3	4284	8	6164	2	1	110	1	100
New Jersey	2	2	1787	0	0	.....	.....	.....	.....	.....
Spiegel	3	3	553	0	0	.....	.....	.....	.....	.....
Pennsylvania:						13	1	120	12	610
Lehigh Valley	32	7	5179	25	10269	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	90	.....	.....	.....	.....	.....
Schuylkill Valley	11	6	4428	5	3647	.....	.....	.....	.....	.....
Upper Susqu. Val	4	2	2367	2	1200	.....	.....	.....	.....	.....
Lower Susqu. Val	10	4	4531	6	2221	.....	.....	.....	.....	.....
Lebanon Valley	11	8	6197	3	2355	.....	.....	.....	.....	.....
Spiegel	1	1	573	0	0	.....	.....	.....	.....	.....
Pittsburgh, Spiegel	30	26	58440	4	7908	.....	.....	.....	.....	.....
Shenango Valley	16	10	16435	6	5779	.....	.....	.....	.....	.....
Western Pennsylvania	19	10	13120	9	4342	.....	.....	.....	.....	.....
Spiegel	1	1	700	0	0	.....	.....	.....	.....	.....
Maryland	5	2	3562	3	2970	4	0	0	4	589
Wheeling District	9	8	10913	1	1080	.....	.....	.....	.....	.....
Ohio:						9	0	0	9	688
Mahoning Valley	13	10	16098	3	3595	.....	.....	.....	.....	.....
Central & Northern	9	9	11974	0	0	.....	.....	.....	.....	.....
Hocking Valley	2	1	280	1	550	.....	.....	.....	.....	.....
Hanging Rock	12	7	2935	5	1147	.....	.....	.....	.....	.....
Indiana	1	0	0	1	130	.....	.....	.....	.....	.....
Illinois	16	13	26337	3	3658	.....	.....	.....	.....	.....
Spiegel	1	1	1019	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	629	.....	.....	.....	.....	.....
Wisconsin	4	2	1863	2	1610	.....	.....	.....	.....	.....
Missouri	2	1	900	1	650	1	1	350	0	0
Colorado	3	2	1781	1	1000	.....	.....	.....	.....	.....
Virginia	22	9	6374	13	8250	4	0	0	4	437
Kentucky	6	4	1764	2	1530	3	0	0	3	300
Alabama	30	19	19755	11	8360	12	2	664	10	2250
Mich. and Wisconsin	.....	.....	.....	.....	.....	17	7	3600	10	3910
Tennessee	12	6	5359	6	3270	9	2	379	7	2310
Georgia	2	0	0	2	960	3	1	310	2	360
North Carolina	2	0	0	2	600	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	11	2	250	9	858
Texas	.....	.....	.....	.....	.....	4	1	175	3	700
Utah	.....	.....	.....	.....	.....	1	0	0	1	175
Oregon	.....	.....	.....	.....	.....	1	0	0	1	275
Totals	304	177	229510	127	83964	94	18	6018	76	13442

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	18	20	19	6,018	5,947	5,062	76	74	13,442	12,942
Coke and Anthracite	177	176	172	229,510	222,988	220,962	127	129	83,964	87,783
Total	195	196	191	235,528	228,935	226,024	203	203	97,406	100,725

*Condensed from the *Iron Age*.

RELIABILITY OF CAST IRON.

Cast iron is undergoing condemnation from many different quarters of late. We have the verdict of some people to the effect that it is unfit for any kind of structural purposes in large buildings, and others aver that it is unsafe and dangerous in the fly wheel; and most of us know very well that it is proving very unsatisfactory in stoves! This, however, is only one side of the question. The fact is that very little science has hitherto been applied in the manufacture of iron castings. If the columns that have collapsed in buildings were analyzed as to chemical content, or examined critically as to mechanical proporiton and symmetry, it would in all probability be found that either the iron mixture used was of very inferior quality, or that some glaring mechanical defect was at the bottom of the trouble. There is a kind of iron used in foundries sometimes that the unscientific molder designates as "rotten." Iron very high in silicon, and, consequently, in graphite, is "rotten;" that is, weak. It can stand very little crushing, transverse or other strain; that is, when used in castings of thick section. In stove plate or shelf hardware it is just the thing, because the quick cooling of thin, light castings prevents segregation of the graphite. This iron, all very well in its place, cast into a building column is what the molder calls rotteniron. Many manufacturers of structural castings make no intelligent discrimination in the choice of iron for their work, simply because they do not know how to do so. It is a case of pure ignorance. No wonder the column breaks, made by such a founder. There is a wide difference in quality of wrought irons; but will anybody condemn wrought iron generally, therefore? The same may be said of steel. If the ship's mast, made of poplar, break, does it follow that wood is unfit for masts? Not at all; the poplar is all right for weatherboarding, but make your ship's mast of Norway pine.

The cast iron column, *per se*, is all right; it is simply the ignorance of the manufacturer that is at fault. Some manufacturers learn very readily, while it takes years for others to make a little forward move, even after they have been told how to do it. There are various reasons for this: for instance, this man may be dull of comprehension, and therefore slow to comprehend the vast difference that varying proportions of the metalloids will produce. Another will comprehend readily enough, but he may have been instructed by an employe, and he elects to wait a year or two before appropriating the information, as he can thus manage to avoid the necessity for giving his instructor credit. Either of these people bring cast iron into unmerited disrepute.

With regard to the other class of defects, viz., mechanical misconstruction, science is in a fair way to correct all these. If the core of the east iron column is permitted to shift in the mold, thus producing a casting thick on one side and thin on the other, as is too often the case, it is small wonder that the column gives out, in use. What is needed in this case is a competent system of inspection rigidly carried out at all times; and in the matter of iron mixtures, an adequate system of testing would insure the quality of the iron.

Another feature of iron founding is just now receiving much and well merited attention. I refer to the proportioning of patterns. At the late meeting of the Society of Mechanical Engineers, in New York City, it was brought out that there were grave defects in mechanical construction generally practiced in the manufacture of fly weels, as demonstrated by elaborate experiment in the Case School of Applied Science. An ounce of practice is worth a pound of theory when dealing with cast iron product. The engineer may calculate with accuracy the directions and extent of strains on a steel truss, and barring error, give safe directions for its construction, but the internal strains of iron castings must be learned by actual experiment. Experiment not only outdoes the engineer in this respect, but in his own proper field it puts him to a disadvantage; for was it not the engineer who planned the fly wheel whose rim was made in sections and bolted together half way between the arms? And did not the experiments at the Case School of Applied Science demonstrate that the connections must be made at the arms? Yes.

There is no danger that cast iron will fall into permanent disrepute as a material for work wherein it is generally desirable, and in particular features, and in occasional instances apparently inadequate. The fact is, we don't know how to use the metal. We have only just begun to seriously study its characteristics; and only comparatively few people are doing even that. But the number of these is being augmented day by day. The torch is freely extended to any who will accept it, and he who shall lose his way and fall into the ditch will have himself to blame.—[E. H. Putnam in Tradesman.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The rumors regarding the sale of the Rhode Island Locomotive Works to a syndicate have been confirmed. The syndicate buying this property is headed by Joseph Leiter, of Chicago. It has also bought the entire foreign rights of the Hoadley-Knight compressed air patents, which were recently bought by the American Air Power Co., of New York, for North and South America, and which system is now being installed by that company on the surface lines of the Metropolitan Street Railway Co. It is stated that Mr. Leiter and his syndicate have made strong European alliances, and that this concern is to be international in more than one line. The syndicate is to have a capital of $7,000,000, and will remodel the Rhode Island Works, and purchase other large works, all of which will possibly be situated at Providence. Plans in detail will be announced in the near future.

The Elmira Mfg. Co. has been organized at Elmira, N. Y., to make hydraulic steam and other engines and machinery. The officers are: President, I. D. Booth; vice-president, F. E. Doolittle; secretary, S. C. Estey; treasurer, S. J. Hall; general manager, N. A. Johns; attorney, Chas. M. Marvin. The directors are the above named officers, together with Henry A. Moore, F. Bright, B. M. Masten, C. H. Firman, F. H. Rees, Wilbur Kenzie and J. N. Ward.

The secretary of the Chicago Public Library will open bids Dec. 28, for sundry interior iron work.

The department of Public works, Chicago, will open bids Dec. 29, for the construction, erection, etc., of the steel roof trusses, girders, wrought and cast iron work, repairs to old roof etc., for the proposed addition to the 68th st. pumping station.

The Virginia Bridge & Iron Co., Roanoke, Va., will be in the market for a bolt and rivet heading and upsetting machine.

The Eagle Iron Co., Attalla, Ga., has been incorporated, with a capital stock of $20,000, by L. S. Colyar, George H. Webb and James H. Barr, all of Chattanooga, Tenn., to manufacture iron, etc. The company has secured and will put in blast the furnace at Attalla.

G. F. Danielson, formerly general superintendent of the Toledo Machine & Tool Co., Toledo, O., has purchased part of the equipment of the Toledo Drop Forge Co.'s plant, at Glassboro, and will soon start up works of his own.

Espe Bros. will start a machine shop and foundry at Crookston, Minn.

The Janesville Machine Co., Janesville, Wis., is planning to build a three-story storage warehouse of brick.

The Albion Malleable Iron Co., Albion, Mich., is about to move from its old to its new works. W. S. Kessler is president and H. B. Parker, vice-president.

The Albion Buggy Co., Albion, Mich., will buy drop presses and dynamo.

New Construction:—

An addition 100x125 feet is being built to the foundry of the Aultman-Taylor Co., Mansfield, O.

Work has begun on the Illinois Steel Co.'s two-story electrical power house, which will be 115x149 feet.

The Malleable Iron Fittings Co., of Branford, Conn., is making extensive additions. The old pattern vault is being torn down to make way for a factory addition, 80x200, two stories, of mill construction and built of brick with gravel roof.

An addition 75x240 feet is to be built by the Michigan-Peninsular Car Co., of Detroit. It will be of steel construction and one story.

Ground has been broken at Homestead, Pa., for the plant of the Mesta Foundry & Machine Co. The foundry, 300x150 feet, will be built first.

Work on the new universal mill of the Carnegie Steel Co., Ltd., at Homestead, Pa., is being pushed as rapidly as possible. Pittsburg papers intimate that the 35-acre tract below the town purchased by the Carnegie Co. last summer may be used by it for a steel car works, but there is no official confirmation of the report that this line of manufacture is to be undertaken.

Contracts have been let for the erection of additional shops and an office structure for the Westinghouse Electric & Mfg. Co., at East Pittsburg, Pa The buildings will cover four acres of ground, making the aggregate area covered by the plant there 28 acres. The present works were erected in 1894, and consist of a machine shop, 750x240 feet, and a wareroom, 750x80 feet, in addition to a power house, blacksmith shops, carpenter shops, brass foundry, and other buildings. The machine shop extension will be of the style of the present shops. The central bay, 70 feet wide and one story high, will be equipped with heavy electric cranes, and the other bays will be two stories high and 80 feet wide. These will have traveling cranes on the first floor. Railroad tracks will run through the extension.

A charter has been granted at Harrisburg, Pa., to the Pittsburg & Allegheny River Railroad Co., to construct a line three miles long, from 32nd st. to Herrs Island, in the Allegheny River. The capital stock is put at $30,000. J. H. Park is president, and the directors are David E. Park, William G. Park, C. E. Clapp, George Wright, Jr., John A. Sutton, and Gilbert M. Black, all of Park Bros. & Co., Ltd., owners of the Black Diamond Steel Works, Pittsburg. The Pittsburg *Times* says: "It is believed that one of the principal purposes of the scheme is to secure connection with the Pittsburg Junction Railroad, on Herrs Island, and with the Allegheny Valley Railroad, so that terminal charge on all freight to and from their works can be obtained. The Black Diamond Works are now badly cramped for room, and as Park Bros. & Co. own about half of Herrs Island, it is not unlikely that the low ground will be used as a dump for the slag from the mill, and that in time the firm will build an extension to its works. A 500-foot span bride, costing fully $150,000, will be necessary."

The Louisville & Nashville Railroad Co. will double the capacity of its shops at Decatur, Ala. New buildings will be erected, new machinery installed and over 500 additional men will be needed when the improvements are completed.

The Golden's Foundry & Machine Co., Columbus, Ga., is constructing an additional building to double the floor space of its machine department; addition is two stories high, 70x160 feet. It is also probable that the company will increase its foundry department, putting in electrical cranes and other machinery.

It is reported that the Lehigh Valley Railroad will provide plants for making its own equipment, and that a wheel foundry will be located at Weatherly, a short distance from Hazelton, Pa.

The new foundry of Wittenberger, Higgins & Co., at Des Moines, Ia., is about ready to start up.

It is expected that a contract will be let soon for the new machine shops and round house for the Northern Pacific at South Superior, Wis.

J. Westwick & Son, Galena, Ill., have made contracts for the doubling of their foundry department.

The Boston & Maine Railroad Co., is erecting at Portsmouth, N. H., a building for its electric power station. It is 118 ft. wide and 64 ft. long, divided into two rooms, one for the boilers, and the other for the engines and electric generators. The side walls are of brick, the roof construction fireproof; the trusses are of steel, and they support steel beams for the purlins on which is to be placed a concrete roof. The contract for the steel work was given to the Berlin Iron Bridge Co., of East Berlin, Conn.

Russel Wheel & Foundry Co., one story steel manufactory, 75x240 feet, for the Baugh steam forges, $6,300, is a recent Detroit building permit.

The Rogers Iron Co., Springfield, O., is building an addition 30x30 feet to be occupied as a blacksmith shop.

The Riter-Conley Mfg. Co., Pittsburg, shipped on Monday, 30 cars of structural material, weighing about 900 tons, for the basic open-hearth steel plant being erected by the Alabama Steel & Shipbuilding Co., at Ensley, Ala.

The Pittsburg Bridge Co., has an order from the contractors building the Mexican Central Railway, for about 700 tons structural material.

The contract has been let to F. F. Schnitzer, for an addition to the Aultman-Taylor Machinery Co.'s foundry at Mansfield, O.

The Barnard & Leas Mfg. Co., Moline, Ill., is erecting a new building 90x40 feet adjoining its foundry and will use it for its blacksmith shop and shaft lathe departments.

At Columbus, Ga., new construction is in progress at Golden's Foundry & Machine Co.'s plant, which will practically double its capacity.

The rebuilding of the Tonkin Steam Boiler Works, at Oswego, N. Y., recently burned, is being considered by W. M. Jermyn and the Oswego Business Men's Association. Boilers, tanks and car trucks are to be manufactured.

Fires and Accidents:—

At Norfolk, Va., the plants of G. W. Duval & Co. (Norfolk Foundry), and W. A. Anderson, machine shop and foundry were badly damaged by fire, Dec. 8.

The Rock Island Railroad boiler shop and tin shop at Horton, Kas., burned, with $5,000 loss.

Fire Dec. 12, at the Missouri Car & Foundry Co.'s plant, St. Louis, did considerable damage to one building; insured.

The main building of the Kutztown (Pa.) Foundry & Machine Shop was destroyed by fire Dec. 10. Patterns which cost the company over $75,000 were burned.

At Sacramento, Cal., the Union Iron Works, of Root, Nielson Co. were destroyed by fire Dec. 14. Loss, $60,000; insurance, $20,000.

General Industrial Notes:—

The Harrison Safety Boiler Works notes the following recent sales of Cochrane feed-water heaters and purifiers: Raritan Copper Works, Perth Amboy, N. J., 1,000 h. p.; Montgomery Ward Co., Chicago, 1,000 h. p.; Chicago & Great Western R. R. Co., Oelwein, Ia., 500 h. p.; Boston Packing & Provision Co., Cambridge, Mass., 200 h. p.; St. Clair (Pa.) Coal Co., 1,500 h. p.; U. S. Glue Co., Carrollville, Wis., 1,500 h. p.; Armour Elevator "D," Chicago, 1,200 h. p.; Rush Run Coal & Coke Co., Rush Run, W. Va., 500 h. p.; Isaac Braithwaite & Son, Kendal, England, 100 h. p.; Phoenix Iron Co., Phoenixville, Pa, 2,000 h. p.; Diamond Ice Co., Wilmington, Del., 200 h. p.; C. W. Boynton, Chicago, 100 h. p.; O. S. Kemmerer, Nazareth, Pa., 50 h. p., special.

The Sylvan Steel Co., Moline, Ill., expects to engage in the manufacture of bolts and nuts. Machines for the manufacture of harrow teeth have been installed recently.

The Youngstown Foundry & Machine Co, Youngstown, O., has recently remodeled and enlarged its plant and installed a traveling crane of 20 tons capacity.

The National Tube Works Co, of McKeesport, Pa., have declared a regular dividend of $1.75 on the preferred stock, payable Jan. 2. A dividend of $1 a share on the common stock was declared on Feb. 15, last. This is the first dividend on the common stock for several years.

While they are now buyers of basic iron in the market, Jones & Laughlins Ltd., of Pittsburg, will have one furnace on that metal when they finish remodeling their three Eliza furnaces and erecting the mammoth fourth furnace already referred to in these columns. The four stacks will produce about 2,500 tons of pig iron a day, which is the present melting capacity of the basic and Bessemer plants.

The Central Iron & Steel Co., of Harrisburg, Pa., at its annual meeting elected the following directors and officers: Directors: Charles L. Bailey, James McCormick, James W. Cameron, G. M. McCauley, Vance C. McCormick, Edward Bailey, Harry B. McCormick, and W. H. Wallace, New York, and J. Frederick Knouchan, New York; officers, Charles L. Bailey, president; James M. Cameron, vice-president; G. M. McCauley, treasurer and general manager; S. B. Boude, secretary.

The ore handlers at the Illinois Steel Co.'s South Chicago docks have received a five per cent increase in wages and on

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Did you know that a steam separator, which is suitable for and is satisfactory in rolling mill service, is just the separator for any kind of a steam plant?

From doing no work, or barely turning over, a rolling mill engine is—**on the instant**—called upon for its maximum effort. The **ingot** comes along on the roll train, is **seized** by the rolls and it **must** go through! That means **steam—all** the steam the engine can take. Usually these engines are a couple of hundred feet away from the boilers—and perhaps these boilers are pretty hard driven. So provision must be made to take care of any water coming along with the steam. Careful tests under the regular working conditions of COCHRANE SEPARATORS protecting such rolling mill engines demonstrated that less than one quarter of one per cent of entrained water passed the separator at any time. Truly a good performance. As such results are given by COCHRANE STEAM SEPARATORS under the very hardest conditions, may they not be relied upon when the work is easier? Seems reasonable, doesn't it? But then they are **proving it** in a thousand other plants not rolling mills. Address,

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Separator Department.
Col. Station. PHILADELPHIA, PA.

Pittsburg Representatives—F. R. DRAVO & CO., Lewis Block.
Chicago Representatives—A. SOR E, Jr. & CO., 1021 Monadnock.

Dec. 24 will be given back pay at the advance dating from early spring.

Hilles & Jones Co., of Wilmington, Del., has recently completed one of the largest gate shears in the world. It was shipped to Russia and has a capacity for shearing 1½-inch plates 12 feet between housings. The driving will be done by a self-contained engine mounted on one housing and driving on to a heavy fly wheel. The main spur gears are of heavy cast steel. There is an automatic stop which brings the gate or sliding head to rest at the top of the stroke. The company has been very successful in securing many orders for foreign shipment.

The Lucy Furnace, at 51st st., Pittsburg, of the Carnegie Steel Co., Ltd., which was being remodeled, was blown in Tuesday of last week and the first cast made Thursday night. The furnace is now working nicely. The other Lucy furnace is in blast.

The Dearing Water Tube Boiler Co., Detroit, has amended its articles of incorporation so as to increase its capital stock from $25,800 to $100,000.

Geo. H. Dunbar, Buffalo, proprietor of the Eagle Iron Works, has been adjudged bankrupt. Creditors meet Dec. 27, when a trustee will be appointed. Liabilities are $96,277.

The Rockport (Ill.) Bolt Works are operated at night, the water power being sufficient in day time for only a portion of its machines.

The Superior drill shops, at Springfield, O., have been transferred to the Pan Handle road for $65,000.

Colebrook Furnace No. 1, at Lebanon, Pa., has been put in blast after an idleness of six months.

The Fowler Cycle Mfg. Co., Chicago, through its assignee, has begun suit against the Whitely Steel Co. and the Whitely Malleable Castings Co., of Muncie, Ind., for $50,000 for alleged violation of a contract.

Reuben Miller, Jr., secretary of the Crescent Steel Co., Pittsburg, is thus quoted by the daily press: "Trade is exceptionally good in iron and steel. We manufacture steel springs for railroad cars and fine crucible steel and edge tools. We have a full force of employees now. Orders are piling up rapidly and we have a hard time to pull through with them. Already we have orders for over 2,000,000 pounds of steel springs. That is over 1,000 tons. The brightest feature of the situation is the way raw materials are strengthening in price. As for steel, prices are ruinously low and often some of the mills take orders at a positive loss, merely to keep running. I believe there are very few idle men in the city at present, for there are no mills worth speaking about that are not running."

The bar mill of the Shenango Valley Steel Co.'s plant at New Castle, Pa., has closed down for changes and repairs and will reopen about the first of the year.

The Scottdale (Pa.) Iron & Steel Co., which has formerly used natural gas and coke in its sheet mill, has completed arrangements for the exclusive use of coal and has put the plant in operation.

The Pittsburg Reduction Co. has received an order from the Standard Electric Co., of San Francisco, for 180 miles more of aluminun wire, this being additional to the big order recently given. This last order will include about 240,000 pounds and will cost $60,000. The San Francisco company is building a power plant in the Cascade mountains, and will send electrical power into San Francisco.

A party of French capitalists and iron men have visited the Ironton structural steel plant at Duluth. The mill has been ready for two or three years to roll beams but has not been operated yet. H. L. Gray is superintendent.

From Kokomo, Ind., comes the report that John Hardemeyer has a process for steel making by the use of scrap and that local capitalists will organize a $50,000 company.

The United States Mitis Co. has brought suits against the American Steel Casting Co., and the Midvale Steel Co., to enjoin them from infringing upon the patent of the complainant upon a process for manufacturing castings from wrought iron and steel by adding aluminum. The bills recite the upholding of the validity of the patent in question by the Circuit Court of Appeals in the case of the Mitis Co. against the Carnegie Steel Co., Ltd., in October, and asks that the defendants be required to account for all profits earned by the unauthorized use of the process.

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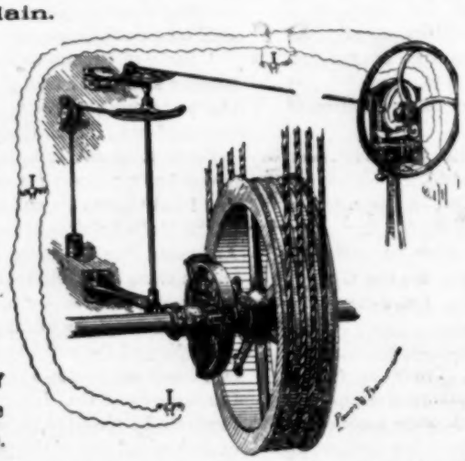

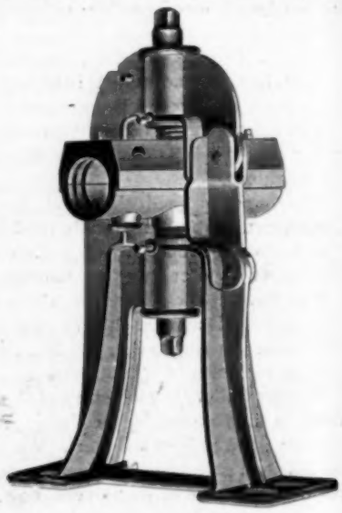

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GENERAL AGENTS FOR THE DODGE INDEPENDENCE WOOD SPLIT PULLEYS.

port that orders have been coming in recently faster than they can be filled, with present capacity, and that the enlargement of their plant in the near future is in contemplation.

The puddling department of the Wheeling Steel & Iron Co.'s Benwood plant is shut down and the plate mill will also be taken off this week. Repairs will be made and the plate mill heating furnace overhauled.

The McKenna Steel Working Co.'s plant, at Armourdale, the Kansas City suburb, will probably not be reopened this winter, orders for renewal of old rails not being sufficient to occupy the Joliet plant and another.

A Youngstown, O., dispatch of Dec. 16, says: The Ohio Steel Co. to-day made a shipment of 25 tons of small billets and 50 tons of tin bars to London, the consignment going to manufacturers in the Sheffield district.

There will be no shutting down of any of the Duquesne furnaces for repairs in the holidays. The Duquesne Steel Works will be closed from Dec. 22 to Dec. 27.

The Baldwin Locomotive Works, Philadelphia, have just received orders for 56 locomotives, of which 16 are for the Imperial Railway of China. A contract with the Reading Railway Co. calls for 25 freight engines and five switching engines. The Chicago & Western has also ordered 10 large freight engines, while numerous small orders have been received. Besides working day and night, it has been found necessary to increase the force of men at the works.

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HOLIDAY EXCURSIONS.

Special Rates via Pennsylvania Lines for Christmas and New Year.

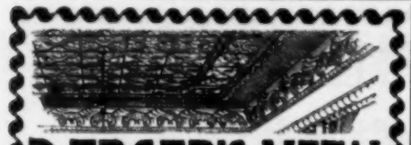
Owing to Christmas and New Year falling on Sunday, and the observance of those holidays to occur on Monday as a rule, the annual custom of the Pennsylvania Lines to grant special rates will this season cover two extra days. Excursion tickets may be obtained over these lines December 23, 24, 25, 26, 30 and 31, 1898, and January 1 and 2, 1899. Tickets for adults will not be sold at less rate than 25 cents, nor for children at less than 15 cents. The return limit on tickets sold at special rates on the above dates will be Tuesday, January 3, 1899. For special information about rates, time of trains, etc., please apply to nearest Ticket Agent of the Pennsylvania Lines.

Holiday Rates C. T. & V. R. R.

Low rates Dec. 23, 24, 25, 26, 30, 31 and Jan. 1 and 2. Tickets good returning to Jan. 3, 1899, inclusive. City ticket office, 241 Superior Street, Cleveland. Depot ticket office, at foot of South Water and Champlain Streets. Cleveland Terminal & Valley Railroad.

New Weddell House Management.

The Weddell House, Cleveland, has long been headquarters for iron ore and iron and steel men, and a meeting place for various associations in the trade. To this large clientage the new proprietors, Messrs. Bates & Swan, announce that a change in prices has been made. There are 75 rooms at $3 a day, 50 rooms at $2.50 and 50 rooms at $2. Meals are 50 cents each. The determination of the management which took hold with December is to keep the Weddell House up to the high standard it has maintained for years, so that it shall continue to be recognized as the meeting place of manufacturers and representatives of important commercial interests. The conduct of hotels has undergone changes in the past few years, quite as marked as in other lines of business. As the manufacturer aims more and more to secure large output, the hotel manager seeks to entertain each day a number equal to the capacity of his house. While all the appointments of the house will be maintained on a high level of excellence under the new management, though the price of single meals is changed, it is the experience of Messrs. Bates & Swan that the new schedule will treble the number of guests. t.



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The name of the Chicago, Milwaukee & St. Paul Railway has long been indentified with practical measures for the general upbuilding of its territory and the promotion of its commerce, hence manufacturers have an assurance that they will find themselves at home on the company's lines.

The Chicago, Milwaukee & St. Paul Railway Company owns and operates 6,154 miles (9,900 kilometers) of railway, exclusive of second track, connecting track or sidings. The eight States traversed by the lines of the company, Illinois, Wisconsin, Northern Michigan, Iowa, Missouri, Minnesota, South Dakota, and North Dakota, possess, in addition to the advantages of raw material and proximity to markets, that which is the prime factor in the industrial success of a territory—a people who form one live and thriving community of business men, in whose midst it is safe and profitable to settle. Many towns on the line are prepared to treat very favorably with manufacturers who would locate in their vicinity.

Mines of coal, iron, copper, lead and zinc, forests of soft and hard wood, quarries, clays of all kinds, tan-bark, flax and other raw materials exist in its territory in addition to the vast agricultural resources.

A number of new factories have been induced to locate—largely through the instrumentality of this company—at towns on its lines. The central position of the States traversed by the Chicago, Milwaukee & St. Paul Railway, makes it possible to command all the markets of the United States. The trend of manufacturing is Westward. Nothing should delay enterprising manufacturers from investigating. Confidential inquiries are treated as such. The information furnished a particular industry is reliable.

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AND

G. A. BICKNELL, M. S.

In the preparation of the second edition of our Handbook, the general plan of the first edition has been followed, viz., to present in concise form such data and information as are useful to the chemist and metallurgist. Several tables of the first edition, which were of somewhat limited use, have been omitted, while more than one hundred pages of new matter have been added.

The methods for analysis of iron ore, iron and steel and for assaying have been given briefly, but perhaps as much in detail as is consistent with the general scope of the book. Several changes and additions to the Specific Gravity tables have been made by adoption of later and more accurate values.

In the notes on blast furnace practice have been outlined the more important theoretical and practical points, which, it is hoped, will be of some service to those interested in the manufacture of iron.

The hygrometric table gives the necessary information for determining the amount of moisture in air, a subject whose importance in metallurgical operations is being more fully recognized at present than heretofore. This table is new and is based on the most accurate data available at the present time.

The tables of weights and measures, United States and foreign, have been very much amplified, and the conversion tables for United States and metric weight and measures of the U. S. Coast and Geodetic Survey included, the latter being based on the legal standard for this country.

Numerous miscellaneous tables have been added, which, it is hoped, will be found of value.

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